

EROS Data Center

Monthly Activity Reports

November 15, 1973 - December 31, 1975

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EROS Data Center
Bimonthly Activity Report
November 5 thru November 16, 1973

I. Accomplishments

1. The number of inquiries and orders for data from the Data Center has shown a substantial and steady increase over recent weeks. Over the past six to eight weeks, the number has increased from an average of 600 units per week to 1,031 units for the week of November 5, and 1,200 units for the week of November 16. This has created a severe backlog in the User Services Group of the Branch of Data Production and Technical Support. Approximately seven additional people have been added to the User Services Group, bringing the current total to five Civil Service and 18 support contractor personnel. Further increases will be mandatory in the immediate future.
2. A concentrated effort has been undertaken to track down and eliminate all outstanding customer complaints and queries. Some complaints are noted as having been active for some time with the basis of the majority of complaints due to a delay in communication follow-up with the customer by the EROS Data Center. All backlogged customer complaints have now been handled with a telephone call and follow-up letter. In the future, all customer complaints will be handled in a time critical fashion. Incoming complaint phone calls, personal visits, and congressional inquiries will be satisfied within an eight-hour working day. Incoming letter complaints will be satisfied within two working days, and incoming customer response cards will be followed up on and satisfied within a three-working day time period.
3. Meetings have been held with the largest and most active of the regional assistance centers, including the facilities at Mississippi, Phoenix, Menlo Park, and the Canal Zone (IAGS). Plans are underway to establish a full-time point of contact at the EROS Data Center to provide personal attention to the regional application centers and browse files to assure that their requirements are satisfied efficiently and that personal attention is provided.
4. The Data Management Group initiated the move of archival imagery from the downtown facility to the new Data Center, moving 500 boxes of imagery as a start of a systematic transfer of all data coinciding with the move of the Photo Lab equipment. The schedule for installation of Photographic Laboratory equipment is proceeding smoothly with the pacing item being the chemical management and waste disposal system scheduled to be completed in February 1974. Plans are being developed on the possibility of handling chemical waste in an interim fashion until the system is fully operational to allow early operation of the Photo Lab at the new Data Center. Quality Assurance Standard Operating Procedures are scheduled for completion in December. Equipment calibration and certification schedule preparation for new equipment installation is presently underway.

5. The move of all components of the Autographic Theme Extraction Laboratory has been completed. All major components have been checked out; however, a system test has not been possible due to the software difficulties. Fortran IV, Text Editor, and other PDP 11 System software have been exercised and stand-alone computer capabilities demonstrated. It will be necessary to revise and rebuild Master system disc to provide full use of the 8K core and to install foreground-background program operation to permit concurrent interactive processing of a picture and either digitizing the next picture or writing the preceding picture. Plans are to accomplish this with a sole-source software contract.
6. The first remote sensing training course to be held at the new facility was completed on November 16, 1973. There were 25 participants representing four Bureaus of the Department, the Corps of Engineers, NASA, the Soil Conservation Service, three state governments, and four private industries. Course evaluation questionnaires provided by the participants are currently being evaluated and summarized. The transfer of the NASA Mississippi Test Facility procedure for land use mapping, using high altitude data and ERTS Satellite data, was particularly successful.
7. A completed revision of the EROS Data Center Computer Requirements document was forwarded to the Director, EROS Program Office in Washington, for review, approval, and subsequent forwarding to the Computer Center Division. This revised Computer Requirements document details current and interim requirements for the use of computers at the Data Center and will be combined with an implementation plan to be furnished by the Computer Center Division with the end product being sent forward for final departmental approval.
8. All Skylab III data has now been received at the EROS Data Center and necessary processing for entry into the 360/30 Computer data base should be completed early in the week of November 19.
9. All job descriptions and personnel actions necessitated by the recent Data Center reorganization and start of contractor operations have been completed, with the exception of those involving GS-13 and higher merit promotion and selection processing. These merit promotion and selection efforts are being processed through the Washington Personnel Office. A Request for Personnel Action has been initiated to fill the job of Branch Chief, Branch of Computer Services, and is being coordinated with the Computer Center Division.
10. The second quarter Financial Operating Plan covering EROS Data Center budget and fiscal requirements and plans was completed and forwarded to the Director, EROS Program Office, for approval. The budget plan identifies required expenditures of \$4,829,000 for Fiscal Year 1974, and also identifies an additional \$258,000 in critical over-guideline requirements. The EROS Data Center FY '75 plan is being developed around a \$6.2 million dollar total requirements guideline.
11. Meetings have been scheduled with the architect and prime contractor to concur in final acceptance and payment by the Sioux Falls Development Foundation. This meeting is scheduled for November 19, 1973. Arrangements have

been made for snow removal with a nearby contractor to work around the substantial delay by GSA in purchasing a snow plow as requested several months ago. Corn harvested from EROS Data Center site resulted in a check for \$118.60, representing the 28% government share, and the check has been forwarded to the Treasury Department.

EROS Data Center
Bimonthly Activity Report
November 15 thru November 30, 1973

I. Accomplishments

1. The number of inquiries and orders for data from the Data Center continues to rapidly increase. During the last week of November, over 2,200 separate inquiries and orders were received. Several techniques are being employed to handle this greatly increased workload. These include:

A. A Quick Response System has been designed and put into operation with an electronic answering device for inquiries and orders resulting from the recent Kodak advertising campaign wherein the caller provides a name and address and a mailing is immediately sent out including a very simple best one-time ERTS coverage data selection.

B. The Technicolor Contract Staff has been increased in the User Services area and nightly training sessions are being provided for the new employees.

C. We have requested and received assistance from the Topographic Division--Mid-Continent Region in the form of trained personnel being detailed to the Data Center to assist during this short-term period.

2. With the above rapid increase in demand for the data, most of the Data Center backlogs have been kept in hand. The one exception to this is the area of orders requiring substantial research in order to satisfy the customer requirements. This backlog is continuing to increase.

3. The newly-established Customer Complaint System appears to be functioning quite well. A total of 60 customer complaints were processed during the month of November, and the general reaction is very favorable. Of 118 customer responses received during November, 7% were critical of the quality of delivered product and 5% mentioned slow service. The remaining 88% were all very favorable.

4. The installation of Photographic Laboratory equipment is proceeding smoothly with the 52-inch wide color processor scheduled on line December 15. Temporary solutions have been found to allow

operation of the chemical management system prior to the time that the facility waste disposal system can be put into total operation. Approximately 70% of the archival imagery from the interim facility has been relocated to the Data Center.

5. In response to the recently generated EDC Computer Requirements Document, the Computer Center Division is in the process of recommending both short-term solutions to the critical computer base problem and is initiating work leading towards release of an RFP for an upgraded computer for the Data Center. The criticality of this activity to future EDC operations cannot be overstressed.

6. A detailed plan for transferring the NASA developed and tested land use inventory technique is in work by Professional Services. Initial coordination between the Data Center and NASA Headquarters (C. W. Matthews) and with the Department of Interior Land Use Planning Organization (L. Marston) has been accomplished.

7. Professional staffing and recruitment for EROS Data Center positions continues to be a high priority item. Final clearance was received during the last two weeks for the position of Technical Assistant to the Chief, EROS Data Center, and the Civil Service certification is being sought for several other positions. Allotment advices have been prepared and submitted to headquarters for funding of EDC accounts in accordance with the current financial operating plan. Snow removal equipment is now ready and available at the Data Center.

II. Problems

Because of the uniqueness of certain EDC operations, and the location of the Data Center in Sioux Falls, South Dakota, and the need for talent not readily available within the Survey or from Civil Service registers, we continue to face substantial problems in the timeliness of recruiting required professional personnel. Paperwork delays in receiving Civil Service approval for candidates not previously employed by the government is jeopardizing our ability to bring on board top candidates. The Data Center will require careful attention by both the Denver Central Region and Washington Personnel Offices if our efforts are to be successful.

III. Data Production Statistical Summary

The following charts reflect the data production and demand statistics for the month of November and for the fiscal year to date.

EROS Data Center
Bimonthly Activity Report
December 15 thru December 31, 1973

I. Accomplishments

1. Customer demands placed on the EROS Data Center have showed signs of decreasing over the recent December holiday period. The number of customer contacts has decreased from almost 2,500 during the first week of December, to 1,236 units for the week of December 24, and 1,081 units for the week of December 31. The first week in January once again indicates an increase in customer demand following the holiday season.
2. The move of all archival film and equipment from the interim facility to the new EROS Data Center has been completed. Essentially, all of the new photographic processing equipment has been installed and brought into control. Problems are being encountered with the 52-inch Simplex color machine and are being worked vigorously with the Simplex design engineers and technicians on site in Sioux Falls. The holiday season, short work weeks, and the extensive relocation from the old facility created a low production total in December. Preparation of the Standard Operating Procedures by the Quality Assurance Section is proceeding roughly on schedule.
3. A statistical analysis of the 155 Customer Response Cards received during December, representing 930 frames of imagery, indicates that 92% are noted as good quality, 5% as fair, and 3% as poor.

EROS Data Center personnel responded to 80 customer complaints during the month of December, 67 of which were satisfied and completed, and 13 are pending further customer response. Slow service and backlogs continue to be our primary source of concern.

4. The addition of temporary help now allows the EROS Data Center switchboard to be manned from 7:00 to 7:00 on weekdays, and 9:00 to 4:30 on weekends. Building and grounds maintenance and snow removal continue in a very satisfactory fashion. The Technicolor Graphic Services and Continental Systems Group contractors were notified verbally by the Contracting Officer that contract modifications, as negotiated, were approved.

5. The final format for the upgraded Computer Complex RFP has been selected, and approximately 90% of the final RFP has been drafted. This activity is taking place in a coordinated way between the EROS Data Center Computer Services Branch and the Washington staff of the Computer Center Division. Requests for additional disk storage for the existing 360/30 Computer have been forwarded to and accepted by the Computer Center Division in Washington. Approval from the Department, for both the temporary expansion of the 360/30 Computer Complex and the procurement of the expanded Computer Complex, are being awaited from Departmental level.
6. The Professional Services Branch continued work on the preparation of training materials, and specifically the syllabus for the forthcoming international course in the summer. The volume of briefings to local educational and service organizations, along with visits to the EROS Data Center, continue at a high level.
7. The full-time Library Assistant is now on board and the EROS Library at the Data Center is proceeding towards operational status. Room arrangements are complete, shelves have been erected, and all Washington EROS Library material has been unpacked and located in appropriate areas.
8. Personnel from the IAGS Canal Zone were at the Data Center in mid-December to discuss continuing interfaces in the area of data production and planning for Professional Services training. Discussions continue concerning the possibility of an advanced disciplinary training course for South American technicians and scientists this coming summer.

II. Problems

1. Delays in processing of personnel paperwork and fiscal status reports continued to plague operations at the Data Center during the month of December. This has recently been brought to the attention of the Assistant Director for Administration, and activities to correct this problem are in work. Recent coordination with the Denver Regional Office and Washington staff will be effective in minimizing the delays and in obtaining the necessary information.
2. Departmental approval for the addition and enlargement of ADP capability at the Data Center has not yet been received. This problem is very critical in that further delays associated with

the mandatory increase in capability will have very severe effects on Data Center performance.

III. Statistical Report

The Data Production Statistical Summary for the month of December and year to date are attached.

EROS Data Center
Bimonthly Activity Report
January 1, 1974 thru January 15, 1974

I. Accomplishments

1. Customer demands placed on the EROS Data Center have shown signs of leveling off at approximately 1500 contacts per week after the holiday period. Approximately 20% of these contacts are being handled by the Quick Response System and the remainder through normal procedures.
2. Essentially all of the major photographic processing equipment is in operation in the Photo Lab. The 52-inch color Simplex processor has been converted from chain drive to belt drive by the design engineers and technicians and is expected to function properly. The chain had been breaking periodically causing chemistry contamination from tank to tank.
3. Training activities at the Center have increased to bring the new employees up to speed as quickly as possible. An example of this is a program for 22 new employees in User Services and Data Management. This program is intended to familiarize and educate the new employees with the source of the data, how it was acquired, entered at EDC, procedures for researching our data base, the functions of assistance and browse centers and how they tie into EDC.
4. Effort regarding the Quick Response System has centered around the selection of ERTS one-time coverage for the conterminous U.S. 488 scenes (99%) of the imagery required for the master rolls have been selected leaving 6 to go. Response to the QRS has been quite good; of the 4400 customers receiving QRS packages, approximately 2000 have submitted orders to the Center.
5. Effort continues to optimize work flow activities from end to end at EDC. An example of this has been the movement of work order staging into the ready access area adjacent to the files that will contain high use image chips and film rolls. The ready access files have not been loaded yet, but plans are underway to accomplish this task shortly.
6. In conjunction with the overall ADP equipment plan to satisfy the extended data base requirements, purchase orders have been issued for additional disk storage capacity and data entry equipment. In addition, program development is underway to implement the Graf Pen Digitizer for use in image accession encoding.

II. Problems

1. The backlog for color enlargements is currently running approximately 80 days. The older DeVere Horizontal Enlarger has been installed and is running with single sheet operation producing approximately 15 units per shift. The new DeVere has been installed but will not be in operation until the 40-inch Roll Transport Easel arrives. Since this equipment is so long overdue, EDC personnel visited the vendor in Los Angeles to expedite equipment delivery. The first of four easels is expected at EDC on January 30, 1974 and should be in operation on February 1, 1974 with production estimated at 100 frames per day.
2. A survey of approximately 1000 ERTS color composites received from GSFC to date has been completed with approximately 60% not meeting acceptable standards because of registration, color balance, cosmetic, and contamination problems. The head of our Photo Lab is currently working with GSFC to arrive at interface agreements that will provide EDC with a product that meets acceptable standards for dissemination to the public.

EROS Data Center
Bimonthly Activity Report
January 16, 1974 through January 31, 1974

I. Accomplishments

1. Customer demands on the Data Center continue at approximately 1500 contacts per week. Approximately twenty-two percent are being handled by the Quick Response System (QRS) and the remainder through normal procedures. As a result of the leveling off of customer contacts and increased staffing and proficiency, most areas have reduced their backlog to a level lower than it has been in months.
2. Two employees from the Center visited the Rocky Mountain Mapping Center to minimum encode 1800 rolls of Alaska film prior to shipment to EDC. After the film arrives, the Graf Pen Digitizer will be used to encode the Alaskan photo indices to compile the necessary geographic coordinates and information for incorporation into the data base.
3. All major building installations and moves have been completed. Some facility systems, like the annunciator panel for the fire detection system, still require "debugging" for proper area identification. The front heated sidewalk and curb area are settling, and corrective action will be taken when warmer weather arrives.
4. Selection of ERTS one-time coverage scenes for the conterminous U.S. has been completed. The master rolls for bands 4, 6, 7 and the color composites are in the process of being built. Band 5 has been completed. Response to the QRS continues to be quite good--of the 5000 customers receiving QRS packages, approximately 2800 have submitted orders to the Center.
5. The draft copy of the RFP for the upgraded Computer Complex has completed extensive review through coordinated efforts between the EDC Computer Services Branch and the Washington staff of the Computer Center Division (CCD). All comments, including those from Mr. Harris Reiche, will be incorporated; and the updated RFP is scheduled to be in Washington February 19 for final review by the EROS Program and CCD and subsequent submittal to GSA.

6. The Professional Services Branch continued work on the preparation of training materials, specifically those required for the forthcoming international course scheduled for early summer. The volume of briefings to local educational and service organizations, along with visitors to the Center, continues at a high level. Numerous inquiries have been received and answered requesting information on application and use of ERTS imagery. The predominant inquiries have been in regard to geologic (minerals and energy resources) and plant sciences (disease detection).

II. Problems

1. We are still experiencing problems with the 52-inch wide color Simplex processor. Converting from a chain drive to a belt drive has not solved all the problem. The belt has slipped off the rollers, and two racks were broken. The leader bars slip and fall off occasionally and destroy the print attached. The racks have been repaired, and we are continually monitoring the processor to prevent any further mishaps and to determine what is causing the processor to malfunction. The Simplex is scheduled to operate two shifts, seven days a week. At the present rate of production, the backlog will be significantly reduced by the end of February.
2. Aircraft imagery annotation tape data received from JSC continues to present a problem. In many cases, the geographic coordinate information on the tape does not agree with that reflected in the cataloging and indexing report or what was actually flown and photographed. These mistakes are being summarized and will be resolved with JSC.

III. Statistical Report

The Data Production Statistical Summary for the month of January and year to date is attached.

EROS Data Center
Bimonthly Activity Report
February 1, 1974 through February 15, 1974

I. Accomplishments

1. Customer demands on the Data Center for the first half of February have averaged approximately 1400 contacts per week. Approximately 15% were handled by the Quick Response System (QRS) and the remainder through normal procedures. Interest in computer compatible tapes has increased significantly during CY 74--41 requests thus far as compared with 58 for last year.
2. A total of 16,421 units were produced by the Photographic Lab during this reporting period. Primary emphasis in the Lab has been towards reduction of backlogs, system improvements for registration and reproduction of color composites, and an increase in the production and dissemination of QRS products. The new shelving for finished product storage has arrived which will double our capability and facilitate finished product dissemination activities.
3. All color composites are being re-evaluated with regard to a new quality coding system. This process should be completed by the end of February, and the information will be added to the data base. The encoding of all U.S.G.S. photo coverage indices is progressing satisfactorily, and entry into the data base should be completed by April 1, 1974. Negatives of the photo coverage indices for the U.S.G.S. Alaska film have been received from Denver for encoding with the graf/pen system. The graf/pen system software is currently being developed and should be operational by the end of February.
4. On February 11 and 12, the Data Center hosted twenty United Nations delegates representing the Task Force on Data Dissemination of the United Nations Working Group on Remote Sensing of the Earth by Satellites. Also in attendance were Dr. John DeNoyer, EROS Program Director, and Mr. Leonard Jaffe, Deputy Associate Administrator for Applications, NASA. The agenda for the international visitors included a tour of the Data Center, a formal presentation regarding Center objectives and functions, and general discussions of the role and experience of the Data Center in disseminating data to both the domestic and foreign community.
5. The RFP for the upgraded computer complex was reviewed by the EROS Program Office and Computer Center Division last week in Washington and will shortly be turned over to Branch of Contracts and GSA. Plans are being formulated to effect operations and maintenance support of the Computer Services Branch by contractor personnel. Jim Duncan, John Musewicz, and William Abbott will visit the Center February 27 and 28 to discuss contract requirements. William Abbott will be the contracting officer for the ADP equipment, and John Musewicz will be the contracting officer for the operations and maintenance staffing contracts.

II. Problems

1. Recruiting problems are envisioned for three or four positions in the Systems Development area regarding digital data handling and processing, spacecraft systems, telemetry and transmission systems, and ground data reception systems. No such talent is known to exist within the Department of the Interior and will require recruitment from other federal agencies or private industry. Procedures to be followed will be worked out with the Washington Personnel Office.
2. The roll transport easel received in early February had numerous light leaks and experienced mechanical and electrical failures. The light leaks and mechanical problems are being repaired. The rotary solenoid used to retract the focus platen has failed, and we are awaiting a modification kit for conversion of the solenoid to a more reliable motor drive.

EROS Data Center
Bimonthly Activity Report
February 16, 1974 through February 28, 1974

I. Accomplishments

1. The technical specifications for the expanded computer complex were released to vendors on February 22, 1974, to allow preliminary review during RFP finalization and GSA approval. Branch of Contracts personnel will visit EDC on March 18 and 19, for RFP final review and wrap-up. RFP release is scheduled for the end of March. The necessary paperwork to effect computer operations and maintenance support by contractor personnel is in process. A staff of sixteen additional personnel will be required through FY 1975, with some starting as early as April 1, 1974. The current Computer Center Division staff of eight will provide contract managers and systems analysts for systems and software design.
2. Two preliminary RFP's have been prepared. The first is for a state-of-the-art Digital Image Analysis and Classification System. This equipment will provide a complete and operable multispectral theme extraction capability for applications activities at EDC. The second is for a Systems Analysis and Documentation Study to provide: Improved status tracking and management visibility of all facets of the EDC system; revised forms and/or documentation for improved operation; customer awareness brochures and simplified order forms to ease the front-end load on EDC operations. We are attempting to finalize both of these RFP's before the end of March.
3. An updated EDC Financial Operating Plan (FOP) for FY 1974 was transmitted to Headquarters on February 22, 1974. The updated FOP reflects the EDC financial requirements and the plan for expenditures by object class and by resources. The FOP is based on actual expenditures through December 31, 1973, and projected financial requirements for the third and fourth quarters of FY 1974. Included also were preliminary plans and requirements for FY 1975 and FY 1976.
4. Substantial improvements have been made in the staging and scheduling of production for printers and processors in the Photo Lab. These improvements have resulted in increased work flow through the Lab and increased efficiency of product lines.
5. Encoding of U.S.G.S. photo coverage indices is progressing on schedule, and entry into the data base should be completed by April 1, 1974. Minimum encode information for 1800 rolls of Alaska

film has been entered into the data base. Further encoding of the index data with the Graf Pen has begun, and data tapes are being generated. This procedure digitizes the index data and records it on magnetic tape for subsequent entry into the data base. The program to enter the tape data into the data base should be completed by the Computer Center Branch shortly.

6. Finished product inspection has been refined and improved. One inspection table for the 20-, 30-, and 40-inch roll paper and large film transparencies is in place. Another is ready for installation, and three more are planned. The cut, collate, and sort function has been removed from the inspector's job assignments, allowing him to remain current in product inspection.
7. The Professional Services organization continues preparation for the June International Training Course. Preparation has centered around developing the schedule, plotting maps, selecting scenes for color mosaics, collecting data for the field trips, etc. The volume of briefings to local education and service organizations, along with visitors to the Center and requests for applications assistance, continues at a high level.
8. Customer demands on the Data Center for the last half of February averaged approximately 1300 contacts per week. Approximately 12 percent were handled by the Quick Response System (QRS) and the remainder through normal procedures. Increased interest in computer compatible tapes (CCT's) continued through the month of February. Response to the QRS continues to increase--of the 6900 customers receiving QRS packages, approximately 3700 have submitted orders to the Center.

II. Problems

None

III. Statistical Report

The Data Production Statistical Summary for the month of February and year to date is attached.

EROS Data Center
Bimonthly Activity Report
March 1, 1974 through March 15, 1974

I. Accomplishments

1. Encoding of USGS photo indices is continuing in an effort to meet the April 1, 1974 deadline. As of March 15, there was a backlog of 11,504 photo indices out of a total of 49,000 to be entered into the data base. Of the 11,504 backlog, approximately 2,500 are already encoded. The program for entering the AMES data into the data base has been completed by the Computer Center Branch. AMES is providing a current annotation tape for their accessions. This data should be in our data base by the end of March. An edit listing of the most recent JSC aircraft annotation tape was furnished to NASA/JSC for evaluation of their data errors. The USGS Alaska film was shipped from Denver on March 15, 1974, and is expected to arrive in Sioux Falls the week of March 18. In the conversion from the Quick Response System (QRS) to the revised QRS system, Data Management has changed the work order cards, delivered to the Computer Center Branch the new J cards for updating the data base, and is in the process of renumbering color composite masters that have been accepted as good quality. The Mississippi Test Facility data that was encoded by MTF has been entered into our data base.
2. Customer demands on the Data Center for the first half of March averaged approximately 1,200 contacts per week. Approximately 16% were handled by the QRS and the remainder through normal procedures. Interest in computer compatible tapes continues to increase. Approximately 15,000 frames of imagery were produced during this reporting period. Reorganization of dissemination storage bins has been completed and shipping is current with production.
3. The RFP for the expanded computer system has completed final approval and is scheduled for presentation to GSA on or about March 22, 1974, and release on or about April 3, 1974. Approval for contractor support of the Computer Center operations and maintenance functions is expected in the next couple of weeks.
4. The RFP for the Production Control, Business, and User Interface System Design and Documentation Study is undergoing final review and is scheduled for release about April 12, 1974.
5. Preparation for the June International Remote Sensing Training Course continues. The course agenda and syllabus outline has been completed. Scene maps of ERTS coverage of 26 countries have been compiled. Imagery, equipment, and supplies are in the process of being ordered.

II. Problems

1. The 3X enlarger delivered to the Photo Lab does not meet resolution specification and has experienced some mechanical problems. The SDA roll transport easel is still not functioning properly due to mechanical difficulties. The extent of these problems render the roll easel unacceptable. The 3.369 film positives are showing cosmetic defects inherent in the working master reproducible because of the point light source in the printer. A diffused light source will be substituted to reduce this problem.
2. The Graf Pen operation for encoding Alaskan indices has been curtailed because of equipment malfunction. The failed equipment has been returned to the vendor for repair and is expected back at the EROS Data Center on April 1, 1974.
3. The Data Center has approximately six major procurements in work excluding the expanded computer system that need to be completed by June 30, 1974, in order to receive FY 74 funding. These procurements will require extensive interface with, assistance from, and review by other organizations within the Department to overcome the ADP non ADP confusion we have encountered lately.

EROS Data Center
Bimonthly Activity Report
March 16, 1974 through March 31, 1974

I. Accomplishments

1. The RFP for the EROS Data Center expanded computer complex was submitted to GSA for review on March 22. GSA subsequently questioned certain parts of the evaluation criteria and desirable features as listed in the RFP. The necessary rewrite of the RFP has now been completed, GSA has granted approval for release, and the RFP will be released to vendors on April 12, 1974. Final arrangements have been completed for contracted operation and maintenance support of the Computer Services Branch. Staffing has begun in order to satisfy ever increasing software programming requirements and will result in an orderly transition to the new expanded computer complex. A total staffing level of 16 man years will result from the gradual buildup by August 1974.
2. Coordination has been completed with the Johnson Space Center/NASA for implementation of remote time share digital analysis capability with Purdue University. A formal request is in the process of being forwarded from the Geological Survey to the Johnson Space Center for addition of the required task to the existing JSC/Purdue contract in support of EROS Data Center requirements.
3. Procurement activities are underway for several major hardware and software efforts required by the Data Center. Among these are a system for production for computer compatible tape generation, a contract for modification of the existing 360/30 Data Base Management System, a graphics output plotter for use in conjunction with the EDC Data Base Accession System and data analysis hardware, a major business systems analysis and development contract, various additions of equipment to the Photographic Production Laboratory, and several pieces of hardware for use in image analysis and training by the Professional Services Branch.
4. Dr. Gene Thorley, formerly Manager, Earth Resources Survey Program for NASA, joined the EROS Data Center staff on March 25, as Chief of Professional Services. Work on the training syllabus and image interpretation techniques for the June International Training Course continues and orders for all imagery to be used in the training course have been made.
5. Modifications to the Karl E. Mundt Federal Building for installation of additional dehumidification systems are underway, and preliminary plans have been completed for an additional rear service access road

to the EROS Data Center site. A local architect and engineering firm is exploring the feasibility of providing additional storage space within or in close proximity to the main building. Storage space continues to be a prime problem and additional areas will have to be available by midsummer.

6. Customer contacts for the month of March totaled approximately 6,000, with the average value per order increasing significantly. Increases in requirements for computer compatible tapes continue, with 168 tapes being produced in March.
7. The geographic encoding of all USGS photo indices into the Data Center data base has been completed and NASA/Ames annotation tapes have been processed, merged with the film roll data, and added to the EDC data base. Initial shipments of Skylab 4 imagery and annotation tapes have been received from NASA/Houston.
8. A meeting is scheduled for April 25-26, 1974, at the EROS Data Center, to be attended by personnel from the Remote Applications Assistance Centers and browse facilities. Plans are to establish the policies and procedures for continued operation of these facilities and to reach funding decisions for FY 75.
9. Production for the month of March reached an all time high of \$81,000 and 32,000 frames of imagery. Current projections for April should see production surpass the \$100,000 per month mark.

EROS Data Center
Bimonthly Activity Report
April 1, 1974, through April 15, 1974

I. Accomplishments

1. The RFP for the EROS Data Center (EDC) expanded computer complex was released to vendors on April 12, 1974. The pre-proposal conference is scheduled for April 29 and 30 at EDC. Proposals are due June 3 with contract award scheduled for August 31, 1974.
2. A plan has been prepared to correct the NASA-JSC annotation tape data for entry into the EDC data base. Initially, only accessions for missions greater than Mission 100 with cameras producing 9-inch format will be effected. All Skylab IV imagery (about 25,000 frames) has been received from JSC except: five rolls of S190A, one roll of S190B, and all 35 mm hand-held film. Entry into the data base will be accomplished after receipt of annotation tapes from JSC.
3. Responses have been received from the sources interested in the RFP for the Systems Design and Documentation Development Contract. The RFP is being released this week with the pre-proposal conference scheduled for April 29; proposal deadline, May 15; and contract award, June 30, 1974.
4. Customer contacts for the first half of April totaled approximately 3,000. Production during this period reached \$80,000 of which \$58,000 was for orders processed before April 1 and the remainder for orders processed after April 1. The dollar value of the incoming orders for this reporting period totaled approximately \$80,000.
5. The Skylab 501 project has been completed by Autographic Theme Extraction personnel and the results shipped to Reston. This project consisted of producing five different density separations of each of 42 S190A and B Skylab enlargements furnished by R & TS, Topographic Division.
6. Procurement activities continue for several major hardware and software efforts required by the Data Center. Every effort is being expended to have these completed or funding committed before June 30, 1974.

II. Problems

1. A major problem in accurately determining the dollar amount of data sales available at any one time for expenditure purposes exists in the present accounting system. Amounts reported as sales at EDC differ from \$100,000 to \$200,000 from amounts reflected in Financial Management records. This discrepancy between reported sales and funds collected has been discussed with the EROS Program Administrative Officer, and he is working with Financial Management to improve the situation.

EROS Data Center
Bimonthly Activity Report
April 16, 1974 through April 30, 1974

I. Accomplishments

1. A workshop was conducted at the Data Center on April 25 and 26, 1974, with attendance from the major Browse Facilities in the Survey. The purpose of the workshop was to compile a mutually agreeable understanding of the present browse configurations and the future implementation of specified goals. Presentations were made by those representatives present on their respective facilities and achievements. It was agreed that a Working Group, representing those facilities will convene at the Data Center on May 13, 1974, for a two-week period. The purpose of the working group will be to develop a standard Reference File package which can be established at any location with minimum effort of assigned personnel.
2. Customer contacts for the month of April decreased slightly from those in March; however, the number of orders prepared remained about the same with the dollar value per order increased approximately 33%. Requirements for computer compatible tapes continue to increase with 244 tapes ordered during the month of April.
3. The pre-proposal conference for the System Design and Documentation Development contract was held April 29, 1974, with six companies in attendance. The results of the conference will be added as an appendix to the existing RFP. Proposal deadline is May 15 with contract award scheduled for June 30, 1974.
4. The pre-proposal conference for the expanded computer system was held April 29 and 30, 1974. Computer Services Branch personnel are currently documenting all questions and answers for addition to the RFP. A delay in the proposal due date from June 3, 1974, to July 3, 1974, has resulted because of the lack of completed benchmark materials which are being prepared at this time and will be issued to the vendors on or before May 21, 1974. Contract award is scheduled for September 30, 1974.
5. Procurement activities continue for several hardware and software efforts required by the Data Center with a goal of contract award or funds committed by the end of this fiscal year. Requests for departmental ADP approval have been submitted for the computer compatible tape generation system, a contract for software modification of the existing 360/30 Data Base Management System, and a graphics output plotter for use in conjunction with the EDC Data Base Accession System and data analysis hardware. Any delays in the approval cycle for these three items will slip them into FY 75 funding.

6. A Management Review was held at the EROS Data Center on April 23 and 24 regarding its status, functions, objectives, and future plans. Members of the Executive Committee, regional directors, personnel from the EROS Program, and other divisions were in attendance.
7. Final preparations for the June International Training Course continue at the Data Center. The training syllabus and image interpretation techniques are almost completed. Preparations for field trips have been finalized and guide assistance arranged. Arrangements have been made for the orientation of the participants upon their arrival in Sioux Falls. Letters of introduction and welcome have been sent to 37 accepted candidates thus far. Preliminary preparations are also being made for the following course which will be held in September-October.

II. Problems

1. Current projections for the tape copying equipment indicate an installation date of August-September, 1974. Without this equipment, the increased workload for CCT's can be accomplished only through use of outside service and/or increased throughput capability due to 360/30 software revision.

III. Statistical Report

The Data Production Statistical Summary for the month of April and year to date is attached.

EROS Data Center
Bimonthly Activity Report
May 1, 1974, through May 15, 1974

I. Accomplishments

1. Customer contacts with the Data Center for the first half of May averaged approximately 1100 per week. Approximately 9 percent were handled through the Quick Response System and the remainder through normal procedures.
2. Effort is under way to correct the NASA-JSC Aircraft annotation tape data for entry into the data base. Minor errors will be key punched, and major errors will be digitized via the Graf/Pen. The program for Graf/Pen digitizing has been completed but the program to merge the corrected data into the data base has not been completed.

The encoding of Alaska data continues to progress. Of the total of 366 USGS Alaska indices, 118 have been digitized and 77 have been added to the data base.

A plan is currently being developed for a data base entry system similar to the Ames system. It will involve the Graf/Pen to digitize coordinate data and supplemental data on an individual frame basis. For those kinds of data that involve strip accessions, the individual frames will be combined into strip accessions by a computer program. The plan is being developed to include both hardware and software.

3. The chemical recovery tanks in the basement area have all been plumbed according to design plans. One silver recovery unit is working. The other four units should be on line by the end of the month. The Ozone generator has been installed but has experienced electrical problems.
4. Goddard's new ERTS microfilm has been evaluated by the Data Center and is considered to be of better quality. The density has been lowered with the contrast remaining about the same as the previously produced microfilm.
5. Joe McSweeney (Publications Division) and Patricia Woll (EROS Program Office) spent two days at the Center explaining the requirements of positive photographic transparencies for lithographic reproduction. Some transparencies were made and one was screened (half toned) successfully on the first try. Ms. Woll has since ordered 16 transparencies which were produced as regular production and then evaluated in the Custom Laboratory for their ability to be screened for lithographic purposes.

6. A Cooperative Education Program Agreement was entered into with South Dakota State University (SDSU) at Brookings, South Dakota, wherein EDC and SDSU will cooperate to place certain students recommended by the University in work assignments integrated with classroom studies leading to a bachelor's degree in specified career fields. The objectives are to give the student exposure to the work world with earnings to meet college expenses and an opportunity to earn academic credit for relevant work experience plus provide EDC with a source of quality employees for pre-professional positions.
7. All amendments to the expanded computer system RFP resulting from the Pre-Proposal Conference have been prepared and issued to the vendors. Preparation of benchmark materials continues with release scheduled late in May. All existing programs to be used in the benchmark have been tested on the 370/155 in Reston to determine a baseline time estimate. These programs will be used to simulate the expected load on the expanded computer system.
8. Final preparation for the June International Training Course continues at the Data Center. Draft copies of the Syllabus have been sent to the Office of International Geology and the U.S. Agency for International Development for their review. Upon review completion, the Syllabus will be finalized for the course.

II. Problems

1. The Financial Operating Plan for the final quarter of FY 1974 was submitted to Headquarters along with projections for FY 1975. EDC will be short approximately \$200K for FY 1974 if all items planned for action prior to June 30, 1974, are accomplished.
2. On May 8, 1974, the Data Center received the remaining three 40" roll easels. Based upon an inspection and evaluation of the easels by the Photographic Laboratory, Quality Assurance, and Support Services, a formal rejection of all three easels was recommended based upon poor workmanship and failure to meet specifications.
3. The Chemical Management System is experiencing replenishment problems due to variations in head pressures. The Ozone generator remains inoperative, and repairs are being made. The waste bleach destruct system appears inadequate to handle the quantity of chemicals passing through the system. Alternative fixes are currently being evaluated.

EROS Data Center
Bimonthly Activity Report
May 16, 1974, through May 31, 1974

I. Accomplishments

1. Benchmark requirements for the expanded computer system have been completed and sent to the vendors. A second pre-proposal conference for discussion of these requirements will be held July 9, 1974, at the National Center in Reston, Virginia. The proposal due date has slipped to August 1 due to the delay in the release of the benchmark requirements.
2. The RFP for the tape copying equipment is being finalized and will be sent to Tom Ragland June 14, 1974, for review by the Engineering Branch and GSFC. The justification for interim tape copying capability by a local vendor is in work.
3. Proposals have been received from four vendors regarding the System Design and Documentation Development effort. These proposals are currently being evaluated by the Technical Evaluation Committee with completion and report submittal scheduled for June 18, 1974. Contract award will be accomplished before the end of June.
4. A two-week workshop was conducted at the Data Center for the purpose of developing a research package to serve as the basic materials for operating an EROS Data Reference File (EDRF). Those personnel participating in the workshop represented the major assistance facilities now in operation.
5. Final preparations for the June International Training Course have been completed. Registration and all preliminary activities have been accomplished for the 34 participants representing 22 different countries.
6. Effort continues regarding the correction of JSC aircraft annotation data. Major corrections involving latitude and longitude are being accomplished via the Graf/Pen system, and minor errors are being corrected via keypunch card update. Approximately half of the 366 USGS Alaskan indices have been digitized and entered into the data base.
7. An inspection of all ERTS imagery has been initiated with completion expected in June. The results of this inspection will ensure that all archival rolls meet required specifications. A bonding procedure has been established to seal these rolls and prevent unauthorized usage.
8. The Administrative Officers of the EROS Program Office and EDC spent the week of May 28-31 reviewing FY'75 funding requirements in depth and discussing proposed changes in individual accounts to more realistically and accurately gather and reflect meaningful costs for Data Production and various EDC operations.

9. A total of 44,796 frames of imagery were produced at a dollar value of \$126,919 during the month of May. General Photo Lab throughput has shown a steady improvement with a worst case backlog of one day for any product type at the end of the month.

II. Problems

None

III. Statistical Report

The Data Production Statistical Summary for the month of May and year to date is attached.

EROS Data Center
Bimonthly Activity Report
June 1, 1974, through June 15, 1974

I. Accomplishments

1. Photographic holdings at the Data Center have reached the five million mark. These holdings consist of approximately 9% satellite-acquired and 91% aircraft-acquired imagery. Extensive effort is underway to provide geographic accession capability to the data base for all five million frames of imagery.
2. Technical evaluation of the proposals submitted for the System Design and Documentation Development contract has been completed and the final evaluation report submitted to the appropriate Contracting Officer in the Branch of Contracts. Contract award is scheduled for June 28, 1974.
3. Integration plans and schedules are in work for the Applications Assistance Data Analysis Laboratory. This Lab is intended to provide state-of-the-art equipment and techniques for extracting information for particular Earth Resources Applications from remote sensed imagery and electronic data. The principal hardware and software that will interface with the expanded computer system are: a General Electric Image 100 System; an Interpretation Systems Image Analysis System; a data analysis terminal connected to the Purdue LARS computer and LARSYS Classification System; LARSYS version 3 Multispectral Classification Software and hard copy printer; and remote data analysis terminals located at Applications Assistance Facilities. The majority of these systems are scheduled to be in operation by the middle of next year.
4. Conceptual plans, schedules, and cost estimates are in work for digital processing capability for a limited number of products at the Center in the near future along with planning for transition to an all-digital data handling and processing system. All planning for the interim capability will consider state-of-the-art equipment and procedures and will be fully compatible with future data processing requirements.
5. The June International Training Course is almost half over. A survey of the 34 participants from 22 foreign countries indicates the course will meet all goals and objectives and result in the best training activity that the Data Center has provided to date.

Attachment

II. Problems

1. A review of Data Center space requirements has been completed, and the conclusion is that there is a critical shortage of space for both offices and supplies storage. Doubling the occupancy of many offices will become necessary during the early months of FY '75. Planning should begin as soon as possible for design of additional space through building modification or a separate facility taking into account lead time for budget cycles and construction activity to meet requirements eighteen months to two years from now.
2. Adequate computer processing time is not available for required program development. Programmers currently have an average of one hour per day for program debugging plus some time on weekends when production processing is completed. This will continue to be a problem until the expanded computer system is in operation sometime next spring.

EROS Data Center
Bimonthly Activity Report
June 16, 1974, through June 30, 1974

I. Accomplishments

1. Effort regarding applications assistance continues to increase at the Data Center and was provided to representatives from the governments and/or universities of Australia, Chad, France, Japan, Mexico, Romania, and Great Britain. This does not include persons attending the International Training Course that concluded on June 27 which was highly successful and met all objectives. Domestic visitors requiring assistance included representatives from the State Department, Office of International Geology, University of Arizona, University of Missouri, Grand Valley College in Michigan, S.D. State Planning Agency, TRW, and the U.S. Forest Service.
2. Design and plans continue for the Applications Assistance Data Analysis Laboratory. Physical space, equipment layout, lighting, electrical power, and air conditioning requirements have been defined. The Lab equipment will initially include the Image 100 System, VP-8 Image Analysis System and the Purdue Terminal. A contract was awarded to Interpretation Systems, Inc. on June 20, 1974, to interface a video disc recorder with the Government-owned VP-8 Image Analysis System. Delivery is expected in 150 days.
3. An initial FY 75 Financial Operating Plan was developed and submitted to headquarters. Many of the Data Center costs such as rents, utilities, contractor costs, and salaries, all of which make up the majority of the budget, are fixed costs leaving very little flexibility for adjustments or special projects. FY 75 needs exceed \$8 million.
4. New task statements for the contract period beginning September 1, 1975, for the Technicolor Graphics contract and the buildings and grounds maintenance contract have been forwarded to the Branch of Contracts for Departmental approval and request for proposals. The System Design and Documentation Development contract was awarded to the Management and Technical Services Company, a subsidiary of General Electric, at a cost of \$294,765.
5. Reimbursable receipts for products from the Data Center totaled \$897,027 in FY 74. Both the dollar value and volume of data products exceeded earlier FY 74 projections that were established last January.

Attachment

6. Proposals are due August 9, 1974, in response to the RFP for the expanded computer system. Extensive benchmark material has been prepared for the second pre-proposal conference scheduled for July 9 in Reston. A multiprogramming operation system has been generated for the existing 360/30 computer to allow for support of inquiry while doing limited program development. This system will be implemented after documentation of required procedural changes and allow accomplishment of the backlog of program development that exists because of the inadequacy of the current computer system to handle the Data Center workload.

II. Problems

None

III. Statistical Report

The Data Production Statistical Summary for the month of June and year to date is attached.

EROS Data Center
Monthly Activity Report
July 1, 1974 through July 31, 1974

I. Accomplishments

1. All activities regarding the expanded computer system continue on schedule. Six amendments to the RFP have been issued since initial release to vendors. The Benchmark Conference was held with representatives from IBM, Univac, Burroughs, Xerox, Honeywell, and Digital Equipment Corporation, with no major problems. Proposals are due at the Branch of Contracts August 9, 1974, and the Technical Evaluation Committee is scheduled to start their review August 19, 1974. Documentation of evaluation criteria and procedures will be accomplished before proposal evaluations begin.
2. A multiprogramming operation system has been implemented for the existing 360/30 computer to allow simultaneous inquiry system processing, small production jobs (CCT production, etc.), and limited program activity. The specifications for the computer compatible tapecopying equipment have been completed and will be submitted to the Branch of Contracts after review by GSFC. The RFP for the flatbed plotter has been completed and submitted to the Branch of Contracts for release.
3. The Applications Assistance Data Analysis Laboratory is developing on schedule. Physical and environmental modifications will be completed during August. The ISI Video Disk Recorder and AP-3 Analog Encoder will be delivered in late September. Specifications for interface of the ISI Video Disk with the PDP 11/20 are being prepared. The LARS/Purdue terminal will be installed and operating by October 8, 1974. Installation of the GE Image 100 System is scheduled to be completed by October 18, 1974. Components of the Image 100 System will begin arriving in late August.
4. Preparations for the next International Training Course, to be held September 19 through October 12, 1974, are underway. A meeting was held at the Office of International Geology, Reston, VA, regarding participant selection and other administrative details. Supplies and equipment have been inventoried. Imagery orders and coverage maps are in work. It is estimated that 20-25 participants will enroll in the course.
5. Applications assistance was provided to representatives of 10 foreign countries, including Germany, Iceland, India, Indonesia, Italy, Japan, Philippines, Saudi Arabia, Togo, and Yugoslavia, and to

Attachment

48 U.S. visitors. Areas of interest include applications to agriculture, environment, geology, geothermal energy, land use inventory, mineral exploration, and water resources. A three-day training session, covering principles of interpretation, mosaicking, stereoscopy, mensuration, and land use classification, was given to staff members of the South Dakota State Planning Board. A draft proposal outlining EDC's role in a cooperative project for land use inventory has been provided to the South Dakota State Planning Bureau.

6. A meeting was held at the Data Center July 9, 1974, regarding distribution of data from EDC to ERTS follow-on investigators. Representatives from NASA, GSFC, ARC, and JSC, were in attendance. The meeting dealt primarily with a Memo of Understanding that will contain the total interface requirements between EDC and NASA/GSFC to accomplish this forthcoming task. Upon receipt of EDC's comments which are due in August, the memo will be finalized for signoff.
7. Photographic holdings at the Data Center number approximately 5.4 million frames, consisting of approximately 8.3% satellite-acquired and 91.7% aircraft-acquired imagery. These holdings have been increasing at an average rate of approximately 110,000 per month. Effort continues to provide geographic accession capability to the data base for all frames of imagery at the Data Center.
8. Compilation of the new Data Center handbook is almost complete. This handbook is designed to optimize the interface between the Data Center and the user community. It will include new prices for products and simplified order forms, along with information regarding the Data Center, its products, and services.

II. Problems

None

III. Statistical Report

The Data Production Statistical Summary for the month of July is attached.

EROS Data Center
Monthly Activity Report
August 1, 1974 through August 31, 1974

I. Accomplishments

1. A request has been submitted to Computer Center Division to obtain a 32K core extension and one additional selector channel for addition to the existing IBM 360/30 computer. This addition will allow the Data Center to fully utilize the recently implemented multiprogramming operating system. Installation should be completed in 30 to 60 days.
2. Documentation of evaluation criteria and procedures for the expanded computer system proposals has been completed. Proposal evaluation began August 19 at the EROS Data Center and continued in Reston, VA, the following week including a one day question and answer session with the vendors in contention. Benchmark activities are scheduled to start the second week in September.
3. Building modifications for the Applications Assistance Data Analysis Laboratory (DAL) continues on schedule. One inside wall has been moved to provide required floorspace and installation of electrical power has been completed. Lighting, air conditioning, and other environmental modifications are nearing completion. Preliminary evaluation of Optronics and Dicomed film recorders has been conducted. Arrangements have been made for two weeks of training on the Purdue/LARS terminal for two DAL personnel during the month of September. The ISI Video Disk Recorder development is on schedule. Preliminary specifications have been compiled for the interface of the PDP 11/20 computer with the ISI image analysis equipment. A partial shipment of the Image 100 system manuals have been received and are being reviewed. A procurement package for maintenance/operation support of the Image 100 system has been prepared and forwarded to Branch of Contracts. Fourteen software programs have been requested from the USGS and FAA. The A-step program has been received from the Johnson Space Flight Center. The necessary interface requirements between the DAL and the EDC computer system have been coordinated.
4. Final negotiations for the September International Training Course continue. Current indications are that 24 participants from 15 different countries will attend. Applications Assistance was provided to 4 representatives of foreign countries and 38 U.S. visitors. Areas of interest included agricultural inventory, data analysis techniques, geothermal energy, land use, mineral exploration and training. The cooperative land use inventory and classification project between EDC and the South Dakota State Planning Bureau is progressing on schedule.

5. Minor building modifications and office and personnel relocations have been completed to make maximum utilization of available space within the Karl E. Mundt Federal Building. Erection of the main entrance sign has been completed. The contract for maintenance services has been extended through September 30, 1974, pending negotiations for a new annual contract. Invitations for bids were issued for a security service contract for the period October 1, 1974, to September 30, 1975.
6. The Senate Committee on Aeronautical and Space Sciences conducted Field Hearings on Bills S.2350 and S.3484 at the Data Center on August 9, 1974. Testimony was presented by Governor Richard F. Kneip, Mayor Rick Knobe, Allen H. Watkins, Victor I. Myers, Jack Allmon, Perry H. Rahn, David Stenseth, and John T. Loucks to the Committee chaired by Senator James Abourezk. Basically, both Bills regard an Earth Resources Operational System, S.3484 would establish an Earth Resources Observation Administration with the Department of Interior and S.2350 would establish an office of Earth Resources Survey Systems within the NASA.
7. The Ames Research Center has supplied EDC with new annotation data regarding approximately 124,000 frames of aircraft acquired imagery for entry into the data base. Ames imagery is currently received at EDC within 30 to 45 days from the date it was acquired. Evaluation of JSC aircraft annotation data continues. To date, 35 missions representing approximately 85,000 frames have been viewed and all necessary corrections made for entry into the data base.
8. The chemical management system has been 97% completed. Exceptions include certain plumbing modifications to the silver recovery units, minor wiring on the ozone communicator system, and changes in rod materials used in bleach tank instrumentation. The controller is programmed and partially in service and has been updated to incorporate automatic checkout procedures. System checkout is scheduled to be completed by the middle of September.

II. Problems

None

III. Statistical Report

The Data Production Statistical Summary for the month of August is attached.

EROS Data Center
Monthly Activity Report
September 1, 1974 through September 30, 1974

I. Accomplishments

1. Physical modifications for the Data Analysis Laboratory (DAL) are nearly completed, with only limited lighting installation remaining. The LARS/Purdue terminal communications link (codex modem) has been installed in the DAL. The LARS terminal is scheduled for installation during the first two weeks of October. DAL personnel have completed two weeks of training on terminal operations, LARSYS standard functions, and use of CP/67/CMS Time Sharing System at the LARS Laboratory. The G.E. Image 100 is scheduled to arrive at EDC within the first two weeks of October and has been inspected at Daytona Beach by EDC personnel. DAL personnel visited Interpretations Systems, Inc. (ISI) to discuss the development of the Video Disc Recorder. The contractor appears to be on schedule, and the Video Disc Recorder is due to be delivered on or before November 15. Specifications for interfacing the ISI image analysis equipment with the EDC PDP 11/20 have been forwarded to the Branch of Contracts. DAL personnel continue to review equipment documentation, classification algorithms, and to gain experience on existing image analysis equipment.
2. The third International Training course began September 19, 1974, and will continue through October 11, 1974. Twenty-two participants from twelve countries are attending. The final report for the training course held in June 1974, has been completed. Applications Assistance was provided to both foreign and U.S. visitors regarding agriculture, forestry, land use inventory, water resources, and remote sensing techniques. Outside interest in the Data Center continues with approximately 1500 visitors during September including 1,011 walk-in visitors and 15 special tours.

A draft proposal for a joint State of South Dakota/EDC project on land use classification has been completed. As part of the project, EDC will analyze an ERTS scene over Sioux Falls with the LARSYS MSS data analysis software. The analysis will be performed at the Purdue Laboratory during October, using CCT's of a May 1973 ERTS scene. Aircraft images and control maps will be used also.
3. One year contract extensions have been negotiated with Technicolor Graphic, Inc. for technical and operational support services and with Continental Systems for buildings and grounds maintenance. A new contract was awarded to Permar, Inc., for security services. Building modifications for support contractor offices are completed.

Modifications to the chilled water and air handling systems have been designed that will save approximately \$5800 in electrical and heating costs this winter.

4. Proposal evaluations for the expanded computer system continued. A 30-day delay of vendor benchmark demonstration will extend the projected contract award date to late December or early January. The system specification for the Tape Copy equipment has been transmitted to Reston for release. The RFP for the flatbed plotter has been released and proposals are due October 21. Specification preparation for terminal equipment continues and is scheduled to be transmitted to the Branch of Contracts November 1, 1974. This specification was requested by the DOI, Office of ADP Management to incorporate the terminal requirements of several government agencies.
5. New order and inquiry forms and the ERTS Worldwide Reference System (EWRS) map for the conterminous U.S. have been finalized and printed. The conversion of the old Quick Reference System (QRS) to the new system has been completed and 20,000 QRS packets mailed to users having had business with the Data Center. The point reference system has also been converted to the EWRS and will appear on the October microfilm listings.
6. Technical investigations, conferences, and plan development have been completed for an ERTS quick-look facility installation at the Data Center. Technical literature from both government and industrial sources has been researched in the areas of S-band antennas; servo drive and tracking systems; pedestal and foundation structures; RF transmission equipment; RF downconverters, demodulators and receivers; bit synchronizers and demultiplexers; high density tape recorders and automatic tape search systems; digital formatters and converters; and film recorders. Studies of the present NASA NDPF, Canadian Prince Albert ERTS ground station, Brazilian ERTS ground station and the planned Italian ERTS ground station were also conducted. The necessary performance and output product criteria, a basic minimum design configuration, a detailed work statement, and estimated capital investment and operating costs have been developed for the quick-look facility.
7. Evaluation of several methods for making ERTS color composites have been completed, resulting in a procedure that will produce products with increased color contrast and saturation and reduced halation. This procedure will be finalized and incorporated into production activities in October.

II. Problems

None

III. Statistical Report

The Data Production Statistical Summary for the month of September and year to date and a Data Base Summary are attached.

EROS Data Center
Monthly Activity Report
October 1, 1974 through October 31, 1974

I. Accomplishments

1. Physical modifications for the Data Analysis Laboratory have been completed. The Purdue/LARS terminal was installed on October 9. Initial problems with poor telephone line communications were resolved when the modems were repaired. Familiarization with the Larsys III program is underway, and digital analysis of multi-date ERTS data over Sioux Falls has begun. The digital analysis is part of a demonstration package for the South Dakota Land Use Project. The General Electric Image 100 System was delivered on October 15, but is not complete because of a one-month delay in delivery of the TV scanners. Due to a number of electronic and software problems, installation and checkout has taken longer than anticipated. Diagnostic tests of the memory, disc and paper tape software, CPU and peripherals, and analyzer control functions are in progress. Award of maintenance and training contracts will be made upon acceptance of the Image 100 System. The ISI equipment has been installed in the Data Analysis Laboratory. Delivery of the Disc Recorder and AP-3 Analog Encoder is scheduled for November 15. A cost quotation for the PDP 11/20 two-way digital interface with the ISI equipment has been received by the Branch of Contracts, and award is expected by mid-November.
2. The joint South Dakota State/EDC Land Use Project proposal has been delivered to the State Planning Bureau. Delays by the State planners have been experienced, but the EDC demonstration analysis has been initiated. A Pacific Northwest Land Use Project, involving the States of Washington, Oregon, and Idaho, has been approved by the Pacific Northwest Planning Commission. The extent of EDC involvement is not well defined, but will probably include an advisory role and demonstration of digital analysis of ERTS MSS data over selected areas.
3. The third International Training Course was successfully completed on October 11. Thirteen of the twenty-two participants stayed at EDC for one-two weeks after the course to gain additional experience with image analysis equipment and to discuss specific resource problems with staff scientists. The final report for the training course will be prepared and forwarded to USGS Office of International Geology for transmittal to USAID and other USGS offices. An announcement of upcoming International Training Courses to be held in May and September of 1975, has been prepared and forwarded to OIG for transmittal to appropriate countries. Preparations for several domestic workshops to be held in the near future are underway.

4. Technical evaluation of the Earth Satellite Corporation Cost Benefit Study has been initiated. Specific emphasis will be on agriculture, forestry, and range applications. The evaluation is scheduled for completion by December 20, 1974. Review of the NASA/Johnson Space Flight Center Task Force study on agriculture inventory is underway. Technical comments on the study are in final review prior to transmittal to NASA.
5. A conceptual system has been developed to demonstrate a digital image processing capability at the Data Center. This system will utilize existing EDC hardware, processing philosophy and techniques developed at the USGS Center of Astrogeology in Flagstaff, and function on a non-interference basis with existing EDC operations. It is planned that this system will be developed and operating by mid-January 1975, using the IBM 360/30, PDP 11/35, PDP 11/20, and Optronics Drum Recorder to produce corrected black and white and color products of a limited number of scenes per week.
6. Benchmark testing for the expanded computer system has been completed. Results of the Technical Evaluation Committee are scheduled to be summarized by mid-November. Contract award is scheduled for late December or early January. Proposals for the flatbed plotter have been received and technical evaluation is scheduled for the week of November 11, 1974. The system specification for the tape copy equipment has been reviewed by the Computer Center Division and submitted to the Office of ADP Management for their review before release by the Branch of Contracts.
7. The new procedure for producing ERTS color composites with increased color contrast and saturation and reduced halation was adopted on September 30, and rework of the 470 scenes covering the contiguous U.S. was begun. Rework of these scenes is scheduled to be finished by mid-November.
8. A new data base entry system has been placed in experimental operation consisting of a Graf/Pen sonic digitizer tablet containing a map, a microfilm projector with a set of Graf/Pen sonic digitizers mounted next to the viewing area, and a PDP 11/20 minicomputer. The Graf/Pen equipment operates interactively with the minicomputer to mathematically determine the geographic coordinates of the corners of aerial photography frames. The geographic data, along with specific frame/roll parameters, is stored by the minicomputer where the frame data will be analyzed by a second process to determine the starting and ending frames of an accession. Information to fully identify each accession will then be supplied to the data base, making the accession geographically retrievable.

9. The Interface Control Document (ICD) between the Data Center and NASA/JSC has been finalized. This document establishes data policies, data product and delivery schedule commitments, and data control procedures between NASA/JSC and the USDI/EDC for NASA Earth Resources Survey (ERS) data.
10. Refinement of the ERTS Quick-Look System (EQS) RFP draft continued, including extensive review by the Branch of Contracts, resulting in a document that is in essence ready for release. Program approval and an RFP release in December would allow system implementation and operational readiness near the end of CY 75. Delays after December could cause funding problems with the funds that have been identified for the system and will cause this capability to slip further and further towards the end of the ERTS-B time frame.

II. Problems

None

III. Statistical Report

The Data Production Statistical Summaries for the month of October and year-to-date and a Data Base Summary are attached.

Attachments

EROS Data Center
Monthly Activity Report
November 1, 1974 through November 30, 1974

I. Accomplishments

1. The EDC Data Reference File (DRF) has been completed and is available for use by the visiting public. One of the primary purposes of the DRF is to serve the needs of customers who wish to browse through the different types of imagery that are available prior to placing an order. Another purpose of the DRF is to develop new ideas regarding how the public dealing with EDC may best be served. For serious users, this might lead to more efficient research methods. For non-serious users, it could mean a source of over-the-counter imagery, lithography, or 35 mm slide packages of areas of interest.
2. An Image 100 Users Workshop was held at the Data Center November 18, 1974, with representatives from those organizations that currently utilize or have on order Image 100 Systems. It included discussions regarding information exchange and coordination of problems, new applications, and improvements in either the hardware or the software. A demonstration of the EDD Image 100 System was also included.
3. Effort continued in getting all equipment for the Data Analysis Lab (DAL) delivered and operating. Training for EDC personnel on the Image 100 System was started on November 21 under a training contract with the GE Company. Terms of contract call for two weeks of training on general system operation and two weeks of training on applications. A 90-day extension in delivery of the Video Disk Recorder to be interfaced with the Interpretations Systems Inc. (ISI) VP-8 Image Analysis System has been allowed. Delay in delivery resulted from deficiencies in the initial recorder planned for the system. The contractor is currently evaluating use of recorders supplied by other vendors. A contract for the PDP 11/20 two-way digital interface with the ISI Image Analysis System was awarded November 25, with equipment delivery in 150 days. Delay in delivery of the Video Disk Recorder will not affect performance under the PDP 11/20 Interface contract.
4. Technical evaluation of the Earth Satellite Corporation Cost Benefit Study continued and is scheduled to be completed December 20. Review of the NASA/Lyndon B. Johnson Space Center Task Force Study on Agricultural Inventory has been completed.

5. Potential demonstration projects and training have been discussed with various personnel within the USDA, Doane Agriculture Service, and South Dakota Association of Cooperatives. A meeting was held on November 21 and 22 at Vancouver, Washington, with representatives of the Pacific Northwest (PNW) Regional Commission, the PNW Land Use Task Force, NASA/Ames, EROS Applications Assistance Center, Menlo Park, California, to discuss plans and participation in the PNW Land Use project. Training packages are being prepared on applications in agriculture and urban analysis. Media training materials (slide/tape) are being edited, and new audio visual packages are being prepared.
6. A two-week NCIC training class was held at the Data Center to familiarize the participants from various regional NCIC facilities with EDC operations. Special emphasis was placed on the detailed procedures and techniques for retrieving information from the EDC Data Base, interpreting the information and initiating work orders for Data Center products.
7. A Preliminary Design Review was held for the Systems Design and Documentation contract effort that is being accomplished by GE/MATSCO. The preliminary design was approved pending resolution of selected action items. Next phase of the contract calls for generation of detailed Systems Requirements Specifications for each functional area of Data Production.
8. A Digital Image Processing Workshop co-sponsored by EROS, NASA, and the Canada Centre for Remote Sensing was held at the Data Center November 19, 20, and 21. Approximately 100 attendees participated including the responsible U.S. and foreign government personnel involved with planning for production digital image processing systems for ERTS data and the recognized industry experts on such systems. The discussion not only pointed out certain shortcomings of our future plans but also focused on specific problems with our current system for handling and processing ERTS data. The meeting was very timely in that NASA, EROS, Canada, and certain other foreign countries are either considering or implementing significant changes to their programs regarding future handling and processing of ERTS data.
9. Installation of a 32K core extension and a second high-speed I/O channel has been completed on the existing IBM 360/30 computer system. This addition will allow full utilization of the recently implemented multiprogramming operating system and provide the additional support required at the Data Center until the expanded computer system is operational next year.
10. Technical evaluation of the proposals submitted for the expanded computer system has been completed. Documentation of the results of the technical evaluation are scheduled to be submitted to the Branch of Contracts by December 23. Contract award should occur in mid January. Review of the tape copy system RFP has been completed by Computer Center Division and the Office of ADP Management and is scheduled for release by mid January.

II. Problems

1. Several problems were encountered over a two-week period due to insufficient hot water for the processors in the Photographic Laboratory. A build-up of calcium deposits was discovered in hot water lines and heaters causing a loss of water pressure. Effected water lines and heaters have been cleaned and purged, plus an additional water heater has been installed in the system to assure sufficient hot water available to support Photo Lab operations.

III. Statistical Report

The Data Production Statistical Summaries for the month of November and year-to-date and a Data Base Summary are attached.

Attachments

EROS Data Center
Monthly Activity Report
December 1, 1974 through December 31, 1974

I. Accomplishments

1. The final technical evaluation report for the expanded computer system was not completed in December as planned. A draft of the report was completed for review and comment by the evaluation committee. Any changes will be incorporated in a final report to be routed for review and concurrence the first week in January. The Source Evaluation Board is scheduled for January 27, with contract award shortly thereafter.
2. IBM 360/30 hardware and software improvements have allowed a reallocation of disk storage and the implementation of a third processing partition. These changes have increased system throughput and solved the problems with order entry that existed during November and December. A major rewrite of two programs of the order processing system has been completed. This rewrite implements the use of the two digit product code and combines the order edit and order processing steps to reduce system run time by 30-40 min/day and simplifies the order entry error checking responsibility.
3. Visits were made to the AAF located in Bay St. Louis, Mississippi, and the ERDF's located at Columbus, Ohio, and Boston, Massachusetts. The purpose of the visits was to become acquainted with the activities, status and materials and equipment needs of those facilities in order to understand more fully the level of EDC support required.
4. A complete quality review of the 470 EWRS color composites has been completed by the Data Center. Of the 470 ERTS transparencies about 70% were rated as "good" which is 3.5 times better than the old set of QRS color composites made from earlier color compositing techniques. The remaining 30% are being reworked so that all 470 scenes will be of "good" quality.
5. Effort on the Systems Design and Documentation Contract by GE/MATSCO continues on schedule. Detailed design specifications are being prepared for each functional area of the Center. A close interface with the computer branch is being maintained to insure proper integrations of the system with the hardware and data base. A joint implementation plan is being prepared to time phase installation of systems to the new expanded computer.
6. An initial draft of the review of the Earth Satellite Corporation Cost Benefits Study has been prepared. This review was not complete because all of the cost Benefits material was not available during the EDC review. The final draft is to be completed during January, after the remaining material has been reviewed by EDC staff.

7. Demonstration and training materials emphasizing soils mapping, crop condition, erosion hazard mapping, urban areas, and geology are in preparation. These demonstrations will include use of data analysis equipment and imagery interpretation techniques required.
8. Training regarding system operations, capabilities, and applications of the Image 100 system was provided to the Applications Assistance Branch by the General Electric Company. Documentation of Operating Procedures of the Image 100 system is in work. Installation of the scanner for the system has been completed. Analysis of ERTS data using the Image 100 for agriculture, forestry and land-use application has been initiated.

II. Problems

None

III. Statistical Report

The Data Production Statistical Summaries for the month of December and year-to-date and a Data Base Summary are attached.

Attachments

EROS Data Center and
EROS Applications Assistance Facilities
Monthly Activity Report
January 1, 1975 through January 31, 1975

I. Accomplishments

A. EROS Data Center

1. The proposal for the South Dakota Cooperative Project has been finalized and sent to Pierre for printing and the Memorandum of Understanding signed by both State and EDC personnel. The critique of State's machine analysis has been completed and sent to the Planning Bureau. The Pacific Northwest Project RFP for Phase I was critiqued and the draft of the preliminary project plan for Phase II was reviewed and tapes and imagery were ordered. Preliminary planning has begun for a land use technology transfer course, USDA/APHIS forest application workshop exercises, and preparations are underway to assemble material for a LARSYS/Purdue Land Use Demonstration package.
2. The Image 100 System has proven to be an invaluable tool for both internal and external data analysis and demonstration activities. Utilization of the system for this reporting period has been as follows: User applications, internal 25.5%; user applications, external 16.3%; demonstrations 7.1%; maintenance 7.6%; software improvement/development 33.2%; and idle time 10.3%. Revisions to the software for specialized processing with the Image 100 System have been initiated. New control documents for Image 100 analysis procedures, including file number assignments, project summary, and time allocation, have been implemented.
3. Interest in and use of the recently created EDC Data Reference File (DRF) are increasing for both internal and external activities. Personnel from several oil companies, a national airline company, and a university remote sensing class were among those visitors using the DRF this reporting period. Approximately 50 hours of assistance were provided, resulting in \$1,114.00 worth of EDC products being sold.
4. A program for creating a complete listing of all imagery available at the various USGS regions is in progress. The various regional centers are currently encoding their data for entry into the EDC data base. To date, we have received inputs from the Mid-Continent Mapping Region and the Rocky Mountain Region. When the program is complete, we will be able to locate any roll of film through our data base and the various regional centers will be able to do likewise via their terminals.
5. Effort on the Systems Design and Documentation Contract by GE/MATSCO continues on schedule in the Detailed Design Phase. System

Requirement Documents are being developed and reviewed with the appropriate EDC sections, and finalized as User System Requirement Specifications. Of the 21 major subtasks, 9 are completed or under review. The remaining 12 are scheduled for release in the next few weeks with all Requirement Specifications completed by May 1. A review of the Maxwell Sroge effort (a subcontract to MATSCO) was held January 30, and System Specifications have been delivered. Effort is currently underway on writing the Casual Brochure, the Technical Handbook, and the Skylab Mission Brochure.

6. Firm and final offers were received from all vendors for the expanded general purpose computer system, and a final selection has been made based on overall cost and technical merit. Announcement of the selection and contract award is being held up because of a GSA requirement for a certification of privacy safeguards for certain customer information in the EDC data base. The required privacy certification will be completed and routed through the EROS Program and Computer Center Division prior to being sent to the Office of ADP Management. Upon review and acceptance by that office, a request for a Delegation of Procurement Authority will be submitted to GSA.
 7. A performance specification has been prepared for a stand-alone high resolution image recording system which will be procured before the end of FY 75. The system will output high resolution B&W imagery from a digital CCT input. The thruput capability of the system will be such that it will satisfy EDC needs for the next 3 to 5 years. Cost for the system will be approximately \$200,000.00.
 8. Plans for a joint program between JPL and EDC have been initiated to document an optimized package of digital image processing techniques and procedures that could be utilized by the EDC, along with other elements of the Federal Government and user community. Completion of the program is contingent upon JPL obtaining the required funds through either NASA SR&T or RTOP funding.
- B. EROS Applications Assistance Facilities
1. IAGS-EROS
 - a. The Chief, IAGS-EROS Distribution Center spent 3 weeks at the National EROS Centers in Uruguay, Argentina, Paraguay, Chile, Bolivia, and Peru to coordinate EROS activities in these 6 countries, evaluate the effectiveness of the EROS Program, and determine future needs. A great deal of time was spent explaining differences in types of imagery products available, various cartographic applications, possible users of satellite imagery, and facilitating a smooth flow of information and assistance between the Canal Zone and the various Centers. The trip reaffirmed belief that the IAGS-EROS Program performs a vital function in Latin America. The National EROS Centers have modified their activities to fit in-country needs and are now generally viable, functioning units.

2. Phoenix

- a. Discussed programs and plans with the Salt River Project (SRP) Watershed Division technical staff for developing operational procedures to be used in connection with the Operational Snow Mapping Project being conducted by the USGS-WRD for NASA in cooperation with SRP. This research effort will include the use of the LANDSAT-DCS to relay near-real time streamflow and snow data from 6 sites in central Arizona. LANDSAT-2 imagery, NOAA-2 imagery, and aerial observations will be used to develop procedures and techniques for operational snow mapping on the Salt-Verde River watershed in central Arizona.
- b. An IBM MCST computer terminal was received and installed for interface with the EDC computer. The monthly EWRS update has been received and implemented. Some 55 rolls of microfilm copies of USGS mapping photography were received and are being used. A portion of the NASA-JSC black and white microfilm (102 rolls) of NASA aircraft coverage were received and reviewed. One roll of Apollo and 8 rolls of Skylab-4 black and white microfilm were also received.

3. Alaska

- a. Effort was concentrated on getting this new AAF up to speed such that it can serve the needs of users in the whole State of Alaska for remotely sensed data acquired by LANDSAT and aircraft and the applications and uses of this data. Data has been ordered from EDC to complete a map showing the best summer and winter scenes of Alaska.

4. Menlo Park

- a. The AAF has been relocated next to the Map and Photographic Sales Center in the Topographic Building. This permits the AAF to concentrate on applications assistance and the selection and ordering of imagery to be handled by the Map and Photographic Sales Center of the Topographic Division. This contiguous location of EROS and Map and Photo Sales constitutes the nucleus for the western arm of NCIC, which is envisioned as a one-stop public service for all Federal maps, photographs, and imagery.

5. NSTL

- a. Hosted the first National Wetlands Classification Workshop directed by the Bureau of Sport Fisheries and Wildlife. The outgrowth of the workshop was a tentative classification system for wetlands of the US which will be compatible with classification systems using remotely sensed data.
- b. Conducted a joint Louisiana State U. and Mississippi State U. EROS Logging Workshop for personnel from 8 forestry firms in the

Southeast. Nearly all were prior users of remote sensing products, and the course was designed to update their application of color infrared remote sensing products for logging operations.

II. Problems

Delays in procurement of the tape copy system and flatbed plotter are starting to impact EDC operations. The tape copy system is required to support the increased requirement for CCT's evolving from both overall user demands and the requirements of the LANDSAT follow-on principal investigators. The flatbed plotter is required to provide data accession aids, management analysis plots, and for verification of geographic indexing parameters of the imagery data base.

III. Statistical Report

The Data Production Statistical Summary for the month of January and year to date and a Data Base Summary are attached.

Attachments

EROS Data Center and
EROS Applications Assistance Facilities
Monthly Activity Report
February 1, 1975 through February 28, 1975

I. Accomplishments

A. EROS Data Center

1. Preparation for the fourth International Training Course scheduled for May is in process. Approximately 20 candidates have indicated an interest in attending thus far.
2. EDC support for the Algerian project was defined and initiated during the visit by Messrs. Fischer and Ragland to EDC. Preparation has begun for the six-week training program to be conducted at EDC for Algerian personnel in June and July. Point reference system maps with overlays have been completed and shipped, and production of approximately 9,000 frames of Algerian imagery is currently in work.
3. Effort on the Systems Design and Documentation Contract by GE/MATSCO and Maxwell Sroge continues on schedule. Preliminary layouts for the Casual Handbook, Technical Handbook, brochures, and new order forms have been reviewed. Final drafts are scheduled for delivery to EDC March 21, 1975, for final review, with final pasteups scheduled for delivery April 28, 1975. A comprehensive design spec for the "Select a Scene" system was completed and delivered. Overall System Requirement Design Specifications are scheduled for completion by April 28, 1975.
4. The specification for the High Resolution Film Recording System (HRFRS) has been reviewed by EROS Program Engineering Branch and NASA/GSFC Image Processing Branch personnel. All appropriate changes have been made to the specification, which has been submitted with a purchase requisition to Branch of Contracts for procurement action.
5. Development of an interactive data entry system, using the PDP 11/20 minicomputer and the Graf/Pen digitizing system has been completed, and the first set of interactive annotation data entered into the EDC data base. Development of this system was started in July 1974, when the Graf/Pen system and the PDP 11/20 minicomputer system were tied together. This system has been developed to provide the capability to process larger quantities of aerial photography geographic annotation information more accurately for entry into the EDC data base.
6. The Memorandum of Understanding between NASA/GSFC and the USGS/EDC, concerning data dissemination from the EDC for LANDSAT Follow-on Principal Investigators, has been finalized and submitted to Reston for USGS approval and signature. The intent of this document is to specify data quantities, quality, prices, delivery goals, and other

criteria required to facilitate the EDC in providing data for NASA LANDSAT Follow-on Principal Investigators.

7. Development of a Worldwide Reference System (WRS) for LANDSAT data coverage continued on schedule. Path and row numbers by country have been established for 90% of the land areas of the world. The land areas that remain are Greenland, Iceland, Hawaii, and the Far Eastern countries. The first major use of this system will be to satisfy a request from the Food and Agriculture Organization (FAO) for available coverage over 137 developing countries.
8. A Financial Operating Plan covering the third and fourth quarters of FY 75, along with preliminary requirements for FY 76, have been developed and submitted to Reston for approval.
9. Technical and cost evaluations and selection have been completed for the expanded general purpose computer system; however, announcement of the selection and contract award has been held up because of a GSA requirement for a certification of privacy safeguards. This certification has been completed and sent to the Office of ADP Management through the EROS Program Office and Computer Center Division. The certification was reviewed by Office of ADP Management and forwarded to GSA on or about February 21, 1975. Once GSA approves the certification, a contract award can be made.

B. EROS Applications Assistance Facilities

1. IAGS-EROS
 - a. Planning continued for the Skylab Latin American Cartographic Conference which currently includes participation from nine Latin American countries. Applications assistance and information regarding available imagery and training programs for image interpretation and its uses continued to academic, government, and private individuals.
2. Menlo Park
 - a. The Pacific Northwest (PNW) Land Use Inventory Analysis Program, a cooperative program between the PNW Commission, NASA/Ames, and EROS, has shifted from conceptual planning to implementation. This land use inventory project, using LANDSAT data, is intended to provide state and local personnel sufficient hands on training and assistance such that they will be able to resolve their land use problems more efficiently in the future.
 - b. Negotiations were completed for a contract with the Institute for Human Environment for preparation of visual materials and manuals for managers and planners at state and local levels, primarily in the Western States. A Basic Order Agreement with Stanford

Research Institute is being negotiated to use the time-lapse study capability of their ESIAC on a task-by-task basis. Although basically designed to fill the needs of Geological Survey researchers, this agreement could also be used to serve other Interior agency requirements.

3. Denver

- a. Approximately \$25,000 worth of data orders were submitted to the EDC during the first full month of order entry operations through the new computer terminal. Approximately 170 individuals visited the facility requiring applications assistance and imagery information. Of these, 18% were from the U.S. Geological Survey, 2% from other government agencies, 50% from college and universities, and 30% from the private sector.

4. Alaska

- a. Selection of 223 scenes to be used for the single LANDSAT coverage of Alaska has been completed. These scenes were of summer imagery and another selection will be accomplished for the best winter scenes for each point reference. The low sun angle scenes will be very useful for geological studies.
- b. A proposal has been submitted to NOAA which is conducting a program of marine environmental data acquisition and analysis along much of the Alaskan Outer Continental Shelf (OCS) for environmental assessment activities. This proposal includes providing remotely sensed data, data processing facilities, and interpretation assistance to the selected investigators in Alaska.

5. Phoenix

- a. Planning has been initiated with the Black Mesa Monitoring Project to use satellite data for operational monitoring of stream flow and sediment measuring instrumentation located in remote areas of northern Arizona. Tentative plans include the immediate use of LANDSAT and later use of GOES data collection systems to collect water resources data from the Black Mesa strip mining area.
- b. On February 7, 26, and 27, aerial reconnaissance of snow cover distribution and oblique aerial photography of snow markers were conducted in cooperation with the Salt River Project (SRP) during LANDSAT passes on these days. These flights were conducted as part of a continuing operational snow mapping project. Preliminary evaluation indicates the feasibility of obtaining photographic records of snow depth by oblique 35mm aerial photography of snow markers. The LANDSAT Satellite Image Map of Arizona is being used as a base for aerial mapping of the distribution of snow cover in central Arizona.

6. NSTL

- a. A Remote Sensing Workshop was conducted for 12 NASA/NSTL management personnel for introduction to the overall field of remote sensing, including both satellite and aircraft imagery. A second workshop is scheduled for later this fall.
- b. A Marine Biology Applications Workshop was conducted for participants from the Louisiana Wildlife and Fisheries, Oyster Division; the University of Alabama Dauphin Island Sea Lab; and the National Marine Fisheries Service Lab in Pascagoula, Mississippi. The intent of the workshop was to demonstrate the use of remotely sensed data in identifying salt marsh vegetation plant species and communities.

7. Reston

- a. Effort continued in getting the facility set up and equipped to optimize providing information regarding available imagery and its application. The majority of the visitors during this reporting period were primarily serious users with areas of interest in Africa, Illinois, Venezuela, Guam, Alaska, and China.

II. Problems

Data slips and tape drive problems have caused increased maintenance and down-time of the GE Image 100 System at the Data Center. EDC personnel have completed checkout of the grounding system to assure that it was not causing the problem. GE personnel isolated the cause to be a loose solder joint in the five-volt power supply system.

III. Statistical Reports

The Data Production Statistical Summary for the month of February and year to date and a Data Base Summary are attached.

Attachments

EROS Data Center and
EROS Applications Assistance Facilities
Monthly Activity Report
March 1, 1975 through March 31, 1975

I. Accomplishments

A. EROS Data Center

1. The tape copy system RFP has been submitted to GSA for review. All subsequent activities regarding this procurement must be on an expedited basis to assure FY 75 funding for this system. An award has been made to Cal Comp for the flatbed plotter system. A site survey of the planned system location has been conducted by EDC and Cal Comp personnel, and no problems were found with space, power, power outlets, air-conditioning, and other physical and environmental requirements. System delivery to EDC is planned for May 19, 1975. A final review of the terminal requirements document has been completed. This document reflects multi-organization terminal requirements consolidated by the Office of ADP Management.
2. A three-day training course/workshop was conducted for personnel of the USDA Animal Plant Health Inspection Service and the U.S. Forest Service, with emphasis on the operational use of remote sensing in plant insect pest control programs (gypsy moth and cotton boll weevil). Visitors representing a private agricultural service company were briefed on possible uses of LANDSAT data in their operations and advised as to appropriate ground data collection and image analysis procedures for their needs. A briefing was given to United Nations personnel (including the Chief of the Outer Space Affairs Division) outlining the international scope of EDC data dissemination and training activities.

Effort continued on the preparation of the LARSYS Remote Terminal demonstration package in land use analysis, and on the development of media training systems. Particular emphasis was placed on audio-visual devices for use in self-teaching and orientation packages to be used both at EDC and other Applications Assistance Centers throughout the EROS Program.

3. Workshop exercises, graphic aids, required imagery, and logistics arrangements for the 4th International Training Course are in progress. Approximately 30 candidates have expressed interest in attending. Preparations are also underway for an orientation and workshop for management and field personnel in the USDA Statistical Reporting Service (SRS) to be held at EDC April 21 through May 2, and a remote sensing orientation course for representatives of the U.S. Forest Service Surface Environment and Mining (SEAM) Program from Montana, Wyoming, and Colorado.

4. Phase I of the Pacific Northwest Regional Commission (PNRC) Project has been reviewed, and preliminary plans for Phase II implementation are underway. EDC Applications Assistance personnel participated in PNRC Task Force meetings to define project teams, test sites, data requirements, and schedules for Phase II. Other cooperative projects include the South Dakota State Land Use Project which continues on schedule, and meetings were held with representatives of the USGS Task Force in Pocatello, Idaho, who are responsible for preparing environmental statements on phosphate strip mining in southeastern Idaho. Purpose of the meetings was to define the extent of EDC participation and type of assistance applicable to conducting an environmental analysis of the region. Information requirements and types of remote sensor data have been identified.
5. Flood and flood-plain mapping capabilities of the Image 100 System are being evaluated. Reaches of the Mississippi River inundated by the 1973 flood are being used as ground truth test areas. Comparison of digital enhancement and classification techniques with optical enhancements will be made to determine accuracy and effectiveness of the digital approach. Another activity with the Image 100 concerns digital image analysis techniques for selected geologic applications. Vegetation association with nickel laterites on Gag Island have been analyzed, and the results will be sent to the EROS Program Office.
6. The Memorandum of Understanding between NASA/GSFC and the USGS/EDC concerning data dissemination from the EDC for LANDSAT follow-on principal investigators has been signed off.
7. Activity in the EDC Data Reference File is increasing monthly. A total of 320 visitors were recorded during this reporting period, representing all sectors of the general user community. Foreign visitors included representatives from Bangladesh, Canada, Romania, Japan, Mexico, France, and India.
8. Utility of the Graf/Pen interactive digitizing system has proven very beneficial for adding larger quantities of aerial photography geographic annotation information to the EDC data base. Approximately 15,000 frames of imagery and corresponding geographic data have been entered into the data base in a geographically retrievable format since the system became operational in mid-February. To date, 98 of the NASA/JSC aircraft missions have been entered into the data base. Production on this system is expected to increase as operational improvements are made and experience is gained.
9. The photographic laboratory continued efforts on the installation and checkout of several large-scale processing systems. Evaluations were performed and process specifications finalized. Initial acceptance tests were conducted on the new Forox microfilm camera, and problems were found regarding resolution and illumination uniformity. Quality control personnel initiated a project to standardize the calibration of all densitometers at EDC. Several new forms were designed for

use in the chemical management system for purposes of keeping more accurate records. In addition, the chemical management system continued to realize significant cost savings in the regeneration of photographic chemicals.

10. A shopping list of equipment, supplies, and services required by EDC has been submitted to the EROS Program Office should FY 75 year-end funds become available. A Phase I review of the proposed warehouse specifications was held with the A&E firm, S.F. Development Foundation, Mr. William Schmidt (Special Assistant to the Director), and EDC staff. A final specification review is scheduled for late April.
11. The RFP for the EDC High Resolution Film Recording System was released to industry March 28, 1975. Proposals are due May 5, 1975, and contract award should occur around June 23, 1975.

B. EROS Applications Assistance Facilities

1. Denver

- a. Approximately 155 individuals visited the facility requiring applications assistance and imagery information. Of these, 10% were from the U.S. Geological Survey; 10% from other government agencies (Federal, State, and County); 35% from colleges and universities; and the remaining 45% from the business, commercial, and private sectors. The breakdown in data file usage was ERTS - 38%; Skylab - 15%; NASA aircraft - 15%; USGS - 8%; and 24% requested computer search of the EROS data bank.

2. IAGS

- a. The date for the Investigators' Conference on the Skylab Cartographic Experiment in Latin America has been set for June 25-27, 1975. Correspondence with the 17 Latin American co-investigators has been completed and local preparations have begun.
- b. Two hundred forty-two frames of ERTS imagery were ordered from the EDC for use in the Latin American countries. One thousand ninety frames of ERTS, five thousand three hundred nineteen frames of Skylab, and a series of remote sensing articles have been sent to the appropriate countries for use in their remote sensing activities.

3. Phoenix

- a. A map showing the February 2, 1975, distribution of snow cover in central Arizona was prepared using the ERTS Satellite Image Map of Arizona as a base. The aerial distribution of snow cover was compiled directly on the Satellite Image Map during an aerial reconnaissance of Salt-Verde watersheds by Salt River Project and USGS personnel in connection with the Operational Snowmapping Project.
- b. Assistance and imagery information was provided regarding a variety of applications. Some of these concerned the use of the ERTS Satellite

Image Map of Arizona for use as a base for plotting solar energy sites and possible locations for a proposed Arizona Solar Energy Research Institute; availability of remote sensing and water resources data for use in developing an open pit copper operation; and use of 1:24,000 scale orthophotographs as base for publishing SCS soil maps.

4. NSTL

- a. Approximately 140 individuals visited the facility requiring applications assistance, imagery, and imagery information. Examples of these activities concerned available imagery to develop a land use map for central Louisiana; LANDSAT and NASA high-altitude aircraft imagery and equipment used for comparison of changes in land area and shoreline for the active delta area of the Mississippi; orientation and forestry applications for a 33-member group of the Food and Agriculture Organization of the United Nations' Seminar on Transport of Wood for Latin American Countries; and a land use planning workshop using low and high-altitude aircraft and LANDSAT imagery.
- b. Effort continued to finalize the design of the EROS/NSTL/AAF brochure. The text, photographs, and a mockup have been completed and are scheduled to be submitted to Reston by April 15 for review and approval.

5. Alaska

- a. The proposal to NOAA for the operation of an Alaskan facility for applications of remote sensing data to Outer Continental Shelf (OCS) studies has been accepted. This project will entail, in addition to disciplinary activities, the preparation of periodic catalogs and maps of available satellite and aircraft data of the Alaskan coastal zone; searching the EDC data bank for all low-cloud cover LANDSAT data acquired since May 1974, and USGS aircraft photography acquired since 1950; purchasing the data needed to update the OCS holdings, both satellite and aircraft; and assisting other OCS investigators in searching for the remote sensing data applicable to their investigations.
- b. Activities continued with State and Federal agencies and the private sector to promote the use of remotely sensed data. Typical of these are activities with the U.S. Forest Service and the Alaska Department of Environmental Conservation (DEC). The Forest Service is interested in automatic digital analysis of an interior Alaska target area as part of a forestry reassessment program, and also in the capabilities of digital classification to identify stages of rehabilitation of clear-cut areas in Tongass National Forest. The DEC concept involves mapping vegetation types along the northern and western coastal zones of Alaska in conjunction with the Coastal Zone Management Program.

6. Reston

- a. Provided applications assistance and imagery information to visitors from Germany, the World Bank, Ohio State University, the Delaware Geological Survey, and others. Presented papers to the Ohio section, ASP; personnel of the Water Resources Division at Columbus; and the Ohio State University Department of Civil Engineering.

7. Menlo Park

- a. Progress regarding the Pacific Northwest Demonstration Project continues. Briefings were given to State operating and decision-making personnel by EDC, NASA, and Geography Program representatives. Of the three initial problem areas selected by the States and commissions (Agriculture, Forestry, and Rangeland), the Forestry group from the States seems to be leading the others, reflecting the initiative of the State people that had been anticipated. NASA, through an agreement to furnish technology assistance to the PNW Commission was asked to review the status of an attempt at Washington State University to develop a new industry based upon the production of basalt fibers. The process involves melting natural basalt and drawing filaments, producing a substitute for rock wool. Geologic advice is being provided to NASA by the Menlo AAF.
- b. Assistance and information transfer to a large number of visitors continued, including activities such as: the utility of base mapping remotely located areas using stereo pairs of LANDSAT and Skylab imagery; assistance in development of teaching materials for secondary schools on Skylab and ERTS data; the use of LANDSAT data for quick determination of the extent of geologic permeable formations; and the use of the additive viewer and Zoom Transfer Scope to determine the extent of basalt flows and other geologic features from LANDSAT imagery.

II. Problems

- a. The lack of progress on the award of the new expanded general purpose computer system continues to constrain the design of improved Data Center operating procedures intended for implementation on the new system. The Source Board for this system was held January 27, 1975; with award planned for February 15, 1975; and system delivery planned for June 15, 1975. A continued delay in this contract award represents a day-for-day slip in the conversion of Data Center computer operations from the existing 360/30 system to the drastically needed, much improved capabilities available on the new computer system.
- b. Formal property survey action has not been completed permitting the declaration of the antenna system as "excess property." Disposal action has been pending for approximately two months. This problem has been brought to the attention of the Chief, Branch of General Services in Reston for assistance in expediting this property disposal.

III. Statistical Reports

The Data Production Statistical Summary for the month of March and year to date and a Data Base Summary are attached.

Attachments

EROS Data Center and
EROS Applications Assistance Facilities
Monthly Activity Report
April 1, 1975 through April 30, 1975

I. Accomplishments

A. EROS Data Center

1. Data sales for the month of April reached an all-time high of \$207,617, the first time they have exceeded the \$200,000 mark. Computer terminal research inquiries exceeded 10,000, and computer compatible tapes for 113 scenes were produced. Detailed data production statistics are included in the attached summary.
2. Dissemination of data products from the EDC to NASA Principal Investigators began during this reporting period. These 35 customers have received a data package explaining their interface with the Data Center, pertinent information regarding data products available, ordering procedures, and their standing account numbers. Internal procedures for handling their requests and orders are working smoothly and no problems are anticipated.
3. Use of the Data Reference File (DRF) continues to increase and, in turn, take a significant load off the User Services Unit by assisting visitors requesting general information about data products available, how they were acquired, their applications, and the various Earth resources remote sensing programs. The DRF had 340 visitors during the reporting period, including representatives from 15 states, and three foreign countries: Canada, Italy, and Nicaragua.
4. Certain improvements have been made in the chemical management system to increase system efficiency and reduce the possibility of cross contamination of chemicals. The Ozone generator is now operating full-time for chemical waste destruction, allowing the ozonated effluent to go directly into the waste treatment ponds, resulting in a cost savings of approximately \$1,000 per month.
5. Three workshop training courses were conducted during April. An eight-day workshop was held for personnel from the USDA Statistical Reporting Service. Topics covered included agriculture applications of remote sensor data, data analysis techniques (Image 100, LARS terminal, and image interpretation) and workshop exercises. A three-day orientation seminar was conducted for personnel of the U.S. Forest Service Surface Environment and Mining (SEAM) personnel. SEAM goals, programs, approaches, and criteria for a demonstration project using remote sensing techniques were discussed. A three-day training course was conducted for Bureau of Land Management personnel in the Canon City, Colorado District. The course was conducted in the field, and demonstrated uses of spacecraft and aircraft imagery for land management applications.

6. Final preparations for the 4th International Training Course, scheduled to start May 9, have been completed. Twenty-six foreign participants are scheduled to attend.
7. Phase III planning meetings were held in San Francisco for participants of the Pacific Northwest Project. The purpose was to identify user requirements, define data analysis tasks, and determine relative roles of participating agencies. EDC personnel participated in working group sessions on forestry and urban activities.
8. A NASA high-altitude U-2 aircraft flight over selected areas in South Dakota has been requested and is scheduled for May 15 and 16. This aerial coverage is being conducted in support of the joint EDC and South Dakota State Land Use Project.
9. Increased utilization of the Image 100 system has required the Data Analysis Lab to expand to a two-shift per day operation. Utilization during the reporting period was as follows: user applications - internal 25%; user applications - external 48%; demonstration projects 4%; preventative maintenance 4%; software development 1%; and downtime 18%.
10. Effort continued in planning and initiating detailed design of the operating software for the new expanded general computer system. A project plan has been completed and a critical path chart established to monitor project development. Essential documents required for detailed design were completed, including a project control guidelines document, a systems architecture design document, and a data base file specification. A software structure for the Phase I User Services on-line system has been completed and is currently in the detailed functional design and specification stage.
11. A bidders conference for the High Resolution Film Recording System was held at the Data Center April 14, with representatives from five industrial firms. Three amendments to the RFP have been issued: two to clarify technical requirements, and one to extend the proposal due date to May 9. Alphanumeric annotation and program instruction for a test EDC scene enhanced tape were completed and are ready to be programmed.
12. Data product generation for the Algerian Project continued. The orders for the 70 mm and 9.5 inch 4th generation custom negatives are 97% complete. The LANDSAT scenes to be utilized in the compilation of the controlled mosaic have been identified by the USGS Special Mapping Center and the order completed less one scene. The order for 9.5 inch paper prints to be printed from the custom 9.5 inch negatives is approximately 75% complete. The 9.5 inch negatives have been collated to agree with the WRS Algerian 1:5,000,000 map and, in turn, will be microfilmed in that order. Fitzhugh Clark, USGS, Reston has been identified to receive all products scheduled for delivery to the Algerian Government.

13. The tape copy system RFP was released to industry April 25. To assure FY 75 funding for this system, the following schedule for activities has been established and must be accomplished: proposals due June 2; technical evaluation complete June 6; negotiations complete June 20; and contract award June 27.

B. EROS Applications Assistance Facilities

1. NSTL

- a. Approximately 112 individuals visited the facility during the reporting period requiring assistance, information, imagery, and training. These activities included: use of aircraft imagery to determine possible encroachments on wildlife areas by private industries performing construction tasks; use of aerial photography to track the currents and island structures along the Mississippi Gulf Coast; how certain aspects of the facility could be duplicated at the NASA Langley Research Center; feasibility of using high-altitude aircraft color infrared photography to map sugar cane locations; measuring wetland vegetation categories in the southern parishes of Louisiana using the digital planimeter; the use of remotely-sensed data to determine sea state and wave heights; and the use of the VP-8 Image Analyzer, Zoom Transfer Scope, Variscan Viewer, and imagery to inventory the forest resources across the Southern United States from Texas to the Atlantic Coast.
- b. On April 14, 15, 29, and 30, EROS AAF personnel and representatives from the Louisiana Office of State Planning performed a joint project to map the extent of flooding in Louisiana caused by the rain-swollen Mississippi River and its tributaries. Data acquired by LANDSAT-2 was received two days after the satellite had made its orbital pass. The extent of flooding was mapped from the imagery and compared with the existing LUDA computerized land use information to determine the economic impact. This operational project was established at the request of the State of Louisiana.

2. Menlo Park

- a. Effort on the Pacific Northwest Project is proceeding on schedule. Two workshops have been held during the month at Ames--one for Forestry on April 3 and 4; and the second on April 28, 29, and 30, for Forestry, Urban, Agriculture, and Range interests of the three Pacific Northwest states. Despite some policy vicissitudes concerning the basic goals, scope, and participants in the project, the lead personnel of Ames, EROS/Menlo Park, PNW Task Force, and EDC are agreed that significant progress has been made in defining problems to be addressed, scope of investigation needed, and levels of accuracy required. The last afternoon of the three-day session was occupied by a tour of EROS Applications Assistance Facility, NCIC, and the Western Mapping Center of Topographic Division. The next workshop is scheduled to be held at EDC in mid-June and is

considered a significant meeting, not only for operating personnel from the States, but management personnel from the Task Force, Ames, and EROS.

- b. Assistance, information, and use of the facility were provided to visitors regarding: the use of LANDSAT imagery in developing a land use monitoring program to minimize the environmental impact of petroleum production in the Barents Sea off northern Norway and in the evaluation of land areas in northern Norway for mineral resource production; available infrared coverage of ocean areas to determine possible indication of active fault zones and location of ocean areas where power could be generated in a large scale heat pump by utilizing the difference in temperature between warm surface water and cold deep water; utilization of LANDSAT imagery in monitoring coal mining operations for the EPA; use of Skylab S-190A imagery in studies of archeological sites and present day urban development studies of Florence, Italy; and the use of aircraft imagery for determination of river gradients for installation of hydraulic mining equipment.

3. Alaska

- a. Notification has been received from NOAA that the Bureau of Land Management has approved the proposal for applications of remotely-sensed data to Outer Continental Shelf (OCS) studies and the final contract should be completed shortly. Computer printouts of all data available for the Alaskan OCS area have been received and are currently being plotted on seasonal maps. Those scenes not in our Library will be ordered from EDC and made available for use by the OCS investigators.
- b. An investigation of unsupervised computer classification techniques using LANDSAT digital data has been conducted, and it appears to have a marked advantage over conventional training set methods when applied to the complex terrain of Alaskan wildlands. Pilot studies were conducted on four Coastal Zone areas using the unsupervised random sampling clustering algorithm followed by maximum likelihood classification on a pixel-by-pixel basis. This technique is expected to have a wide application to Coastal Zone management activities to be conducted by the Alaska Department of Environmental Conservation over the next several years.

4. IAGS

- a. Approximately one-half of this reporting period was spent in Ecuador, Colombia, and Venezuela, to evaluate the effectiveness of the IAGS/EROS Program, coordinate operations, and provide training and assistance where necessary. The transfer of remote sensing technology concept has been successful in these countries, especially in Venezuela. Much of the remainder of the month was spent researching requests for information received during the

trip. Information was obtained from the IAGS projects in South America regarding the use of INPE as a source of imagery. The consensus was that no other agency outside of Brazil was utilizing INPE because their prices were too high for most Latin government agencies.

5. Phoenix

- a. One hundred sixteen computer searches for imagery coverage were conducted, and assistance and training provided to 34 visitors, including imagery and equipment required for riparian vegetation mapping along the Colorado River, the use of the B&L Zoom Transfer Scope (ZTS) to transfer information from aerial photography onto topographic base maps for flood-prone area studies, and the use of the Spatial Data Density Analyzer for analysis of ERTS imagery.

6. Reston

- a. The Reston AAF continues to gather equipment and imagery and should be reasonably up to speed by June. Assistance and training were provided to a variety of visitors, including the areas of general utility of satellite and aircraft imagery, application of ERTS imagery for agricultural surveys in Korea, application of ERTS imagery to oil exploration, geology applications in Haiti using ERTS and Skylab imagery, and utility of satellite or aircraft imagery in prospecting for serpentine.

II. Problems

None

III. Statistical Reports

The Data Production Statistical Summary for the month of April and year to date and a Data Base Summary are attached.

Attachments

EROS Data Center and
EROS Applications Assistance Facilities
Monthly Activity Report
May 1, 1975 through May 31, 1975

I. Accomplishments

A. EROS Data Center

1. A contract award for the expanded general purpose computer system was made May 12, 1975, to Burroughs Corporation for a B6700 computer system. During the week of May 19, a site inspection team consisting of hardware, software, and sale personnel visited EDC. System installation is tentatively scheduled to begin in early July. Computer room modifications are in progress and scheduled for completion prior to planned system delivery.
2. The Calcomp Plotter has been delivered and installed at the Data Center. Acceptance testing is scheduled to start during the first week in June. Finalization of the Terminal RFP is in progress and should be released to industry in June.
3. Design and specification has been completed for the new warehouse and approval for bid solicitation granted. Bid opening is scheduled for June 12. A review was held with the Denver Region GSA Office to determine the need for continued Government ownership of real property at EDC. The findings were that no acreage should be declared excess to EDC's requirements and another review made after installation and operation of a data receiving facility. A highly complimentary report was received from the Federal Energy Team that visited EDC in April to review energy conservation measures that had been implemented at the Data Center.
4. The first image was produced from the EDC initial digital image enhancement system. First generation black and white negatives of the four LANDSAT spectral bands were produced on the optronics drum recorder and a color composite produced in the Photo Lab from three of the negatives. An analysis of the output product indicates that scene definition is fairly good but some problems existed with contrast and cosmetic appearance. Effort will continue to optimize all aspects of this product.
5. Proposals were received for the High Resolution Film Recording System (HRFRS), technical evaluation has been completed, and a technical evaluation report submitted to the contracting offices. Preliminary negotiations were held with acceptable vendors May 26 through May 29. Contract award should occur the week of June 16.
6. Detailed design of the operating software for the new Burroughs B6700 computer systems continued. Four on-line models have been completed and specifications for initial programming have been released. Effort regarding the MATSCO system design and documentation contract continued. Review of the technical and casual brochures has been completed. Final art work and text preparation for the casual brochure are in progress.

7. Establishment of a calibration lab is in process, and orders for spare electronic parts and additional test equipment have been initiated. Completion of these activities will allow EDC to accomplish increased in-house maintenance and equipment problem resolution and greatly decrease the need for outside electronic equipment maintenance and repair.
8. The Fourth International Training Course was completed at the Data Center. Nineteen participants arrived for the formal workshop presentations (May 9-30), and nine will remain for the optional week of individual study. The Workshop program included classroom lectures and workshop exercises related to remote sensing principles and the application of LANDSAT imagery and aerial photography interpretation to various disciplines (geology, agriculture, land use, etc.). A four-day field trip to the Black Hills area afforded the opportunity to field-verify many of the interpretations made by the participants. The participants also had the opportunity to spend at least three full days interpreting LANDSAT imagery of portions of their own countries with which they were very familiar.
9. EDC personnel participated in the NASA-sponsored Earth Observation Satellite (EOS) planning meeting held at Purdue University on May 1 and 2. The review panel was charged with making final recommendations on the specifications for the Thematic Mapper (TM) to be flown on the EOS. The 30 persons attending the meeting made recommendations on number of channels, channel band width, IFOV, signal/noise, sensitivity, spatial resolution, and period of coverage.
10. NASA high-altitude aircraft (U-2) flights were successfully made on May 15 and 16 over selected areas in South Dakota. The flights were requested in support of the South Dakota Land Use Project being done in cooperation with the South Dakota State Planning Bureau. Requests for NASA high-altitude aircraft flights to occur in FY 76 over selected areas in Colorado, Idaho, North Dakota, and South Dakota, have been submitted, and approval is pending. These flights are being requested in support of ongoing demonstration projects.
11. Use of the Image 100 system both internally and externally continues to increase for data analysis and denotation purposes. Several software improvements were made to the Image 100 programs and will be presented at the next Image 100 Users Group Meeting. These included an improved one-channel "density slicer" with options to set the range of each slice at the console, and improved "contrast stretch," with user options for setting limits, cosmetic corrections to "1-D training and display" reports, and better default parameters for "initialization" and "video I/O" routines.
12. The necessary ADP approvals have been acquired and the specifications prepared and transmitted to Reston for a LARSYS classification conversion system for implementation on the new expanded general purpose computer system. Further procurement activity for this system in FY 75 will be contingent on FY 75 year-end funds becoming available.

B. EROS Applications Assistance Facilities

1. Menlo Park

- a. On May 5, 6, and 7, Lathram represented EROS and the Alaskan Geology Branch at the meeting of the International Circum-Pacific Environment and Resources Committee. Of significance to EROS is the request by the Committee that Lathram (with the help of Raynolds, Doug Carter, and whoever else will volunteer) add to the tectonic and/or geophysical Circum-Pacific maps, geologically significant ERTS linears of western North America over 1000 km. in length. These will be the first truly regional maps on which these linears, mostly unrecognized in mapping or aerial photo study and inadequately considered in resource and tectonic analyses, will be brought to the attention of the entire earth-science community, as contrasted with the limited remote sensing community.
- b. Andre Maurin, Campagnie Francaise de Petroles, Paris, spent May 12, 13, and 14 with Lathram completing a manuscript of the computer-assisted statistical analysis of geomorphic features in northern Alaska to provide a mathematical basis for tectonic and mineral fuel resource analyses based on ERTS image interpretation in that area by Lathram and Bill Fischer.
- c. Copies of ERTS mosaics of California, Nevada, Arizona, and Colorado were provided to the Geology Panel of the National Science Foundation for the Foundation's annual program review the last week in May.
- d. Considerable effort was spent on the Wrangell project in Alaska. This volcano, about 250 miles east of Anchorage is heating up. A DCP from EROS, and funding from NSF is being made available this year to the U. of Alaska to monitor this volcano, and NASA/AMES has expressed interest in a university grant fund next year to augment the study. Ames will fly U-2 coverage this June.

2. NSTL

- a. The EROS AAF at NSTL assisted the Louisiana State Science Foundation's Technology Transfer Office by providing the technical information which will be printed on the border of their Louisiana mosaic. The Louisiana Office is in the process of producing a lithograph of the Louisiana mosaic produced by the General Electric Company in Beltsville, MD.
- b. A positive transparency of the Mississippi mosaic was sent to the EROS Data Center during May for inclusion in the data base. This will enable numerous customers who have requested copies of the mosaic to purchase it.

- c. From May 6-9 this AAF held its first geology workshop--it also was the first extended (4-day) workshop in some time. Aid received from Sioux Falls and from the Water Resources Division (WRD) at NSTL made it possible to broaden and deepen the content of the course. Participants included Peabody Coal Company, Ashland Exploration Company, Forest Oil Corporation, Mississippi Geological Survey, and free lance geologic consultants. All in all this workshop was one of the best that this AAF has held so far.
- d. Currently we have four universities representing different types of remote sensing classes that are participating in these types of activities. Each of these students again had specific tasks and tests to perform on each of our various pieces of equipment. The end results of this type workshop have in the past been a series of very original remote sensing papers. We have asked Dr. Lewis to make available to us some of these reports. We are having some of the graphics of these papers reproduced as an example of the kind of support that an AAF can provide to local and regional college-level remote sensing classes. Some of the student-derived applications of both imagery and equipment have been rather unique; in fact, we are sending copies of some of these reports to the equipment manufacturers since they have expressed a desire in this sort of information. Dr. Tony Lewis and a party of three advanced geography students from Louisiana State University participated in a two-day (May 16 and 17) hands-on equipment demonstration/utility workshop. If other AAF's are interested in obtaining some of these reports, please contact us.
- e. Work has currently been initiated on the two, full-length courses scheduled for mid-summer. These workshops deal with urban area analysis and will be given in conjunction with the University of Mississippi. Participants will receive credit toward graduation. We have currently been working with the Mississippi Governor's Liaison Office and the Gulf Regional Planning Commission with respect to the development of new urban area land use workshop exercises. Materials for use in the classroom are currently being ordered to meet the June 7 Sioux Falls order deadline. The Gulf Regional Planning Commission will provide sufficient maps and support materials for both classes. Mr. Bill Smollen, NASA's Technology Transfer Representative with the New Orleans Planning Commission, has agreed to address both classes and to work up a transportation zone exercise using aerial photography.

3. Alaska

- a. A purchase order was received from the U.S. Forest Service for the Alaska AAF to participate in a forest inventory in the Chitina Valley, a 2,500,000 acre area tentatively withdrawn by U.S.D.I. from state and native land selections under section D-2 of the Alaska Native Claims Settlement Act. Under this purchase order the AAF will provide the digital LANDSAT data and perform an unsupervised land-use classification of the area. The Forest Service will do the field work to check this preliminary analysis out and refine the classifications assigned.

- b. The Alaska AAF participated in the activities of the Delta Planning Project, conducted by a group of personnel from various state and federal agencies. The project involves the preparation of a comprehensive land-use plan for the Delta region, a 1,319,000 acre area in interior Alaska which has extensive agricultural and recreational potential and is presently strongly affected by the construction of the trans-Alaska oil pipeline. Our participation in the project involves the preparation of a vegetation map for part of the region based on a computer classification of LANDSAT data.
- c. Work is also continuing on a computer classification of four Coastal Zone areas about Prudhoe Bay, Beechey Point, Kotzebue Sound, and the Seward Peninsula. This work is being done as a demonstration project for the Alaska Department of Environmental Conservation, who will do the field work to complement and verify our analysis.

4. IAGS

- a. Efforts were concentrated on shipping LANDSAT imagery, coordinating the upcoming Skylab Conference, and copying microfiche. There were various problems with our LANDSAT standing order causing much time to be spent sorting our duplicate imagery for return to EDC. By the end of the month the standing order appeared to be functioning properly.
- b. Considerable time was spent on arrangements for the Latin American Skylab Cartographic Conference. A firm list of attendees was established and arrangements made for housing them in the Canal Zone. We also made arrangements with Kodak Panama to print the end products of the conference, i.e., the Skylab Maps.
- c. The 1973 volume compilation of the TAC abstracts was received and forwarded to the EROS Centers.
- d. The Skylab Principal Investigators Conference will be held June 25-27. This will provide a chance to make an assessment of the values and potential of Skylab data. In addition it will provide an opportunity to discuss other aspects of the Latin American EROS program.

II. Problems

None

III. Statistical Reports

The Data Production Statistical Summary for the month of April and year to date and a Data Base Summary are attached.

Attachments

EROS Data Center and
EROS Applications Assistance Facilities
Monthly Activity Report
June 1, 1975 through June 30, 1975

I. Accomplishments

A. EROS Data Center

1. Training of EDC personnel for operation of the new Burroughs computer system has begun. The first course was held in Paoli, Pennsylvania for systems design personnel and concentrated on data base definition and structure. Additional training courses for other elements of the system will be held at the Data Center through the middle of July.
2. Post installation checkout and acceptance testing of the Calcomp Plotter have been completed. Program development has been initiated concentrating on programs for plotting the LANDSAT WRS set of nominal scene centers, verification of aircraft photography geographic coverage before entry into the data base, and plotting of LANDSAT and Skylab coverage over specific areas of interest.
3. Conversion of the IBM 360/30 system software for operation on the Burroughs system has begun. A system flowchart has been completed which includes all program modules, temporary and permanent files, and input/output media for all 360/30 production software. A control procedure has been implemented to insure that all software changes made at EDC are transferred to Burroughs for incorporation into their converted software package. Completion of this task is scheduled for January 1, 1976.
4. Final negotiations were completed for the High Resolution Film Recording System (HRFRS) and a fixed price contract awarded to Goodyear Aerospace Corporation, Litchfield Park, Arizona on June 20, 1975. A "kickoff" meeting was held with Goodyear the last week in June for detailed discussion of all the technical aspects of the system. A system design review is planned in August.
5. Bids for the new EDC warehouse were received and opened. Contract award and ground breaking are scheduled for July. Building modifications required to accommodate installation and operation of the Burroughs computer system are 85 percent complete.
6. Extensive use of the Data Reference File (DRF) continues. During the reporting period, there were 306 visitors from 14 foreign countries, 26 states, and 7 universities. Data orders placed by visitors to the DRF totaled \$2,226 for the month.

7. Development of the Worldwide Reference System (WRS) for LANDSAT data coverage continues. A WRS listing of all LANDSAT imagery covering Argentina and a WRS listing and associated computer cards for the area covered by the Italian data receiving station have been provided to these countries, per their request. Documentation of the WRS has been initiated and should be completed by the end of July.
8. Building modifications for the electronic equipment calibration and maintenance laboratory have been completed. Approximately 80 percent of the new electronic test equipment ordered has been received and is currently in the process of being tested.
9. The 4th International Remote Sensing Workshop was concluded with an optional week of individual, supervised study in early June. Nine attendees participated in the additional week and completed interpretation of their individual country areas, and they utilized advanced analysis techniques under the direction of EDC applications scientists and the analysis equipment in the Data Analysis Laboratory.
10. A 4-day training course was conducted for over 40 specialists from Federal and State agencies in Idaho, Montana, and Oregon participating in the Pacific Northwest Demonstration Project. The course was split into two concurrent sessions, one which presented basic information on remote sensing technology, and one for attendees with a more advanced background. Personnel with advanced backgrounds in remote sensing were supervised by applications scientists, and they utilized digital processing and analysis techniques in the Data Analysis Laboratory. The results of the advanced analysis sessions were reported to the entire group of attendees on the last day of the course. A 1-week workshop was conducted for Forest Service personnel from the Hawaiian Islands. The workshop focused on the use of digital analysis techniques for classification of forest land and for change detection. The Image 100 system was utilized to obtain training statistics for LARSYS classification.
11. The workload in the Data Analysis Laboratory (DAL) remained heavy during June. Image 100 system data analysis utilization exceeded two shifts/day, with digital image processing being run on the third shift. DAL operating procedures have been established that outline user priorities and scheduling, maintenance, software development, demonstrations, maintenance of the tape library, and user documentation. Installation of portions of the ISI 170 system were completed. The digital interface portion will be installed during July. The ISI system is complementary to the other systems in the DAL and will allow expanded analysis capability for users.

B. EROS Applications Assistance Facilities

1. Denver

- a. Approximately 225 individuals visited the facility requiring applications assistance and imagery information. Of these,

92 percent were from the private sector, 5 percent from the USGS, and the remaining 3 percent from other Government agencies. Approximately 25 percent of the individuals requested computer inquiry of the EDC data base.

2. Phoenix

- a. Schumann attended the NASA Earth Resources Survey Symposium held June 8-13 in Houston, Texas, participated as a panel member in the State/Local Users Session, and presented a paper on the Arizona Land Use Experiment.
- b. NASA high-altitude aircraft, Skylab, and aerial mapping photography were reviewed with U.S. Soil Conservation Service personnel to determine their usefulness in the assessment of the environmental impact of the Central Arizona Project. Computer searches of additional areas of the state will be run for further coverage. USGS WRD personnel reviewed imagery of Northern Arizona for use in vegetation mapping.

3. Menlo Park

- a. Effort continues regarding the Pacific Northwest Demonstration Project. NASA/Ames has received approval and funding from NASA Headquarters for their participation in the project. The remote sensing workshop conducted by the EDC was considered highly successful by the many participants involved with the project that attended. During the first week in June, Anderson, Gaydos, and Lathram discussed the Geography Program input to the project and the interrelations of the project and LUDA, and reached a common understanding which has been detailed in a memorandum to the record.
- b. The potential value of LANDSAT imagery for providing accurate base maps in remote and poorly mapped areas has been emphasized by work done on the Tibesti area in Libya-Chad by a Stanford anthropology student using LANDSAT imagery, gridding, and four or five known control points.

4. Alaska

- a. A joint project has been initiated with the USDA Soil Conservation Service to attempt mapping of flood hazard areas from remote sensing data. The project, an outgrowth of the Delta Planning Team activities, will involve the use of an unsupervised LANDSAT computer classification as well as photographic LANDSAT products, U-2 imagery, soils data and hydrological information to map tentative boundaries of flood prone areas in a two million acres study area. Field work will be conducted later in the season to verify the boundaries mapped.

- b. The contract for participation in the NOAA/BLM program of assessment of the Alaskan Outer Continental Shelf has been received and work has begun on the compilation of a catalog to be mailed to all investigators by the middle of July. A large order for imagery will also be placed in July which will bring our files of the LANDSAT imagery of the Outer Continental Shelf up-to-date and make all available imagery easily accessible to the OCS investigators.

II. Problems

Office space for both government and contractor personnel is becoming a serious problem at the Data Center. A space review is required to determine short-term solutions for the existing problem and provide long-term plans to accommodate space requirements for the next five years.

III. Statistical Reports

The Data Production Statistical Summary for the month of June and year to date and a Data Base Summary are attached.

Attachments

EROS Data Center and
EROS Applications Assistance Facilities
Monthly Activity Report
July 1, 1975 through July 31, 1975

I. Accomplishments

A. EROS Data Center

1. Data collected to date for the Red River Flood Project in North Dakota and Minnesota includes LANDSAT imagery and CCT's; high-altitude, color IR photography (scale 1:120,000) from the NASA/JSC RB-57 aircraft; medium altitude, color IR photography (scale 1:48,000) and low-altitude, color IR photography (scale 1:12,000) by Horizon's Inc.; low altitude, oblique photography; and ground data by Applications Assistance staff. The data collection has been a coordinated effort involving applications scientists in Hydrology, Geology, and Agriculture from EDC and the EROS Program Office. Preliminary analysis of data and compilation of information requirements has been initiated. State and local government agencies have been contacted, and plans have been made to assist in meeting information requirements. Short-term plans of the project include working with these agencies to provide assistance in assessing the extent and magnitude of flood damage. Longer term objectives are to publish a flood and flood-plain mapping documented application procedure.
2. An award has been made to Univac for a 90/30 computer system and associated equipment that will be used for LANDSAT CCT reproduction and reformatting and graf-pen digitizing at the Data Center. Pre-installation site inspection has been completed and system delivery is scheduled for October 3, 1975.
3. Conversion of the IBM 360/30 software for use on the Burroughs system continues. The first group of programs (those required to build and maintain the data base) have been completed and EDC personnel will verify the results early in August. Burroughs personnel have completed their final pre-installation site review. No major problems were encountered and all minor issues have been resolved.
4. Effort continued to support the Pacific Northwest Regional Commission (PNRC) and South Dakota projects. Supervised and unsupervised, discriminant analysis of LANDSAT data has been completed to provide examples of Phase II products for the PNRC Range/Wildlife Working Group. An Urban Working Group meeting was held at Ames to define the schedule, tasks, and responsibilities for Phase III. Ground data surveys have been completed in Stanley, Hughes, and Sully Counties, South Dakota for the State Planning Bureau. A draft of the component parts of the Phase I report for the project has been prepared.

5. Extensive use of the Data Analysis Lab (DAL) for training, demonstration projects, and internal and external analysis activities continued. Digital analysis of LANDSAT data has been completed in support of the Eastern hardwood defoliation study, Hawaii Ohia decline and forest succession study, and the forest inventory study with the Washington Department of Natural Resources.
6. The Data Reference File had 255 visitors during this reporting period including representatives from eight foreign countries, twenty-four states and two universities. Data orders placed thru the DRF totaled \$1,508. A MCST has been installed in the DRF to provide increased capability in answering customer requests for data coverage.
7. Price lists and order forms have been revised to incorporate the price changes that became effective August 1, 1975. A mailing of the new price list has been made to all 1975 customers to notify them of the changes.
8. Microfilming of the color WRS scenes has been completed and are scheduled to be duplicated and distributed by mid-August. As a result of discussions with Ames, EDC is looking into the feasibility of microfilming their imagery. An engineering study is currently in progress to determine if the microfilming system which was designed for a maximum format of 9 x 9 can be modified for the 9 x 18 format of the U-2 data. This would create an additional workload of 2,500 to 3,000 frames per month; however, it would make Ames imagery microfilm available much earlier than in the past.
9. Geographic information for 12,564 frames of imagery was entered into the data base during this reporting period via the graf-pen system. Digitizing time required to accomplish this task was approximately 182 hours. To date 115 JSC missions have been entered into the data base leaving 29 missions to be completed.
10. The Project Development Plan (PDP) for installation of the Burroughs 6700 system, conversion of IBM 360/30 (MK I) software, and development and installation of new (MK II) software for the B6700 system has been completed. Functional software specifications have been completed for the Fiscal, Research, and Order Entry functions of User Services, and transmitted to the Computer Services for preparation of detailed program specifications and implementation. Specifications for Billing, Standing Request/Order and all batch programs are in work and scheduled to be completed in early September.
11. Representatives from the American Mining Congress visited the data center July 17 to firm up logistic plans for the 1st Annual William T. Pecora Memorial Symposium to be held October 28-31, 1975 in Sioux Falls, S.D. The schedule for the Data Center tours on Tuesday and Friday, necessary audio-visual equipment, rooms to be used, desire for a remote computer terminal to the EDC Data Base, and other logistic requirements were defined and agreed upon.

12. Contract and lease documents have been signed for the new 15,000 square foot EDC Facility Support Building. Ground breaking and construction have been started and completion of the building and access road is scheduled for November. This facility will provide the space needed to house all material and equipment storage and support services under one roof.

B. EROS Application Assistance Facilities

1. IAGS

- a. The Chief of the IAGS - EROS Distribution Center traveled to the Central American countries of Costa Rica, Honduras, Guatemala, and El Salvador to evaluate the effectiveness of the EROS program in country, coordinate operation and provide training and assistance as needed. The FY 75 IAGS-EROS Program Progress Report is scheduled to be completed and ready for distribution in August. Effort continued on the Skylab PI Report including translating, writing abstracts, and printing reproduction of the individual maps. It too is scheduled for completion in August.

2. Phoenix

- a. Assistance, training, information, and use of the facility were provided for: WRD personnel using NASA high-altitude photography and equipment for continuing a flood-prone area mapping project; Salt River Project (SRP) personnel developing a current high resolution image base for use in planning a new hydrological power plant near Phoenix; discussions with Arizona Resources Information System (ARIS) personnel regarding the feasibility of developing a cost effectiveness study for user application of the NASA high-altitude coverage of Arizona taken in support of the Arizona Land Use Experiment.

3. Alaska

- a. Effort continued on the Soil Conservation flood plain mapping project. Imagery is being prepared for interpretation by hydrology-geology specialists in late August. Examination of early spring LANDSAT data is showing indications of flooding caused by stream icing and overflow. From 1:63,360 scale B+W enlargements of LANDSAT images, the area of flooding can be delineated.
- b. The final report has been submitted to the Bureau of Indian Affairs and Doyon Ltd., a regional native corporation, on a resource analysis of 8,500 square miles in seven scattered areas from which Doyon Ltd. must select lands under the Alaska Native Land Claims Settlement Act. The resources analyses included timber and mineralization potential. Doyon Ltd. was very pleased with the results of the report and based on it is entering into negotiations with BLM for land trades and with three geological firms for geochemical sampling of recommended areas.

- c. A 3,000 square mile region in the Chitina River valley is being considered for establishment as a new National Forest and National Park. We have assisted an interagency planning group in acquiring an inventory of geomorphological features of the region from the interpretation of LANDSAT data. Approximately \$442 of photographic products were ordered by the Forest Service from EDC and an equal amount of processing work was done on a rush basis by our own photographic laboratory for certain requirements with severe time constraints.

The major portion of the project depended upon the results of a computer analysis of digital data from portions of two LANDSAT scenes. An unsupervised classification technique was used to provide color-coded maps of more than forty categories of vegetation, barren cover and water. We produced all the output product forms on an urgent basis so that they would be available for field work by agency personnel during July 14-28. Correlation of the interpreted satellite data with ground truth generated by the field parties is still underway.

4. Menlo Park

- a. Assistance and information has been provided regarding: ways in which remote sensing could be used by the Outer Continental Shelf Office of BLM in their regional environmental monitoring programs; possible benefits of remote sensing to the Conservation Divisions activities on the OCS and possible interaction between the EROS program and the Pacific Program of Conservation Division; ways in which EROS could assist the Geologic and Water Resources Divisions in the solution of the problem of monitoring the hazards associated with the heat increase in Mount Baker a volcano in Northern Washington. Discussions are in process with Ames for periodic overflights with their thermal infrared instrumented twin engine Cessna; use of LANDSAT data for Census studies in Bolivia; and results of geological research in Alaska using LANDSAT Data.

5. NSTL

- a. The facility had 67 visitors, made 123 computer searches of the EDC Data Base, placed 56 orders for 205 data products at a dollar value of \$2,752. Requests for information about uses and applications of satellite or aircraft data continued at an encouraging rate. Imagery and the digital planimeter were used by U. S. Forest Service and International Paper Company personnel to measure forest lands and update their forest type maps. Others requiring use of the facility and information were: representatives from the Mississippi Research and Development Center investigating the feasibility of using high altitude aircraft photography to prepare a tax map of the state of Mississippi; representatives from the University of South Alabama examined satellite data in preparation for field work regarding limestone formation in the Yucatan Peninsula; and representatives from the Coastal Studies Institute of Louisiana State University

seeking assistance in using satellite and aircraft imagery to map the coastal zone of Louisiana.

II. Problems

None

III. Statistical Reports

The Data Production Statistical Summary for the month of July and a Data Base Summary are attached.

Attachments

EROS Data Center and
EROS Applications Assistance Facilities
Monthly Activity Report
August 1, 1975 through August 31, 1975

I. Accomplishments

A. EROS Data Center

1. Preparations have been completed for the Fifth International Remote Sensing Workshop scheduled to start at the Data Center September 5, 1975. Thirty-three attendees from 20 countries have signed up for the course. Major activities have included alteration of course agenda and sequence, syllabus modification, image ordering, and logistics arrangements.
2. Applications Assistance personnel met with members of the Oregon State Engineer's staff in regard to the Pacific Northwest Regional Commission (PNRC) Project to inventory irrigated lands in the Klamath River Basin on a yearly basis. Sample plots were selected and field data collection efforts were planned and begun. A draft of the PNRC Project directory was completed. A meeting was held with an Urban Working Group in Portland to define parameters for the Portland/Vancouver Working Group effort. Agendas were planned and outlined for September meetings of forestry, agriculture, and urban working groups. - A briefing on the status of the PNRC Project was delivered to EDC Senior Staff and a support status review document was prepared for distribution. From August 25-29, members of the Range Management Working Group of the PNRC Project visited EDC and engaged in an advanced techniques training workshop. The principals and theory of using machine-aided image analysis techniques were presented, followed by "hands-on" training using the Image 100 and the LARS Terminal. For each exercise using DAL equipment, LANDSAT scenes had been selected and prepared which covered areas in Oregon, Washington, and Idaho of direct interest to the user.
3. Effort continued on the North Dakota Flood Project utilizing LANDSAT and aircraft imagery acquired before, during, and after the occurrence of the Red River Valley flood. On August 7, 1975, a briefing on the status of the project was given in Bismarck to approximately 75 people representing more than 20 federal and state agencies. In addition, on August 13, 1975, a thorough briefing on the project was given to North Dakota's Senator Milton Young.
4. On August 19-21, the EROS Data Center, in cooperation with the American Society of Photogrammetry, hosted the Fifth Biennial Workshop on Color Aerial Photography. More than 60 persons attended the workshop and 20 technical papers were given, including a debate on the advantages and disadvantages associated with using the near infrared portion of the spectrum when photographing healthy and diseased vegetation.

5. All the existing EDC Phase I image enhancement algorithms have been examined in detail. No avoidable cause for the long 360/30 processing time was discovered. A series of program bugs and truncation effects were identified as likely producers of irregular banding anomalies in the processed images. Discussions were held with other organizations engaged in image processing of LANDSAT imagery (U.S.G.S., Flagstaff, TRW, IBM, JPL, ESL) with the result that a new destripping algorithm is under development and the probable future form of geometric correction is becoming evident. Two additional scenes were processed (Needles, CA and Fargo, ND) using both the standard procedures and a new variation which enhanced visibility of fine detail over a wider dynamic range of brightness. A "bit swapping" program error was discovered, which when corrected significantly improves the processed imagery. A Project Development Plan (PDP) is being prepared for the EDC Digital Image Processing (EDIP) project and should be ready for review in September.
6. The existing 15 month contract with G.E.-MATSCO will terminate October 8, 1975. An extension to this contract is being considered to encompass generation of all MARK II Functional Software Specifications. The final deliverable of the existing contract will be the Phase I Mark II procedures document.
7. The bulk of the functional specifications for Phase I of the Mark II software were received by Computer Services. This begins a major 6 to 9 month software development effort for implementation of on-line inquiry, order entry, and accounting systems.
8. Burroughs 6700 computer system hardware has been delivered to the Data Center and is currently being installed and checked out. Acceptance Testing is scheduled to begin on September 22, with formal acceptance expected by November 1.
9. A Critical Design Review for the High Resolution Film Recording System (HRFRS) was held at Goodyear/Arizona on 8/14/75 and the HRFRS hardware development is progressing on schedule (2/20/76 delivery). Effort continues on the HRFRS Test Tape. The control program and 23 modules for writing 38 different line sets are complete and about 50% debugged. Coding is complete for the alphanumeric annotation, with the loading and test program written. All programs are scheduled to be complete and the first level test tape generated on the PDP 11/20 by September 30, 1975.
10. A preliminary FY 1977 budget has been prepared and submitted to the EROS Program Office based on an SIR funding mark of \$8,970,000.
11. Preparations continue regarding EDC support for the upcoming Pecora Symposium to be held in Sioux Falls October 28-31, 1975. Support to date has centered primarily around making arrangements for installing a computer terminal adjacent to the AMC booth, firming up the agenda for EDC tours, and making sure that the required audio visual equipment needed to support the sessions will be available.

12. Ceremonies were held for dedication of Young Boulevard at the EROS Data Center, August 13, 1975. Senator Milton Young from North Dakota was in attendance.
13. The EROS Data Center Data Reference File (DRF) sales reached an all time high of \$2,338 during this reporting period. The DRF had approximately 315 visitors representing 11 non-U.S. countries, 32 states and 10 universities.

B. EROS Applications Assistance Facilities

1. Alaska

- a. Effort continues on the Soil Conservation flood plain mapping of the Delta Junction region. Color digital products have been received and are being analyzed and ground truth is being obtained to assist in the project mapping. The major portion of the OCS products ordered in July have arrived and have been catalogued. Copies of the aircraft imagery obtained for various OCS projects have been catalogued also and will be available for use in the browse facility.
- b. Permission has been received from the Geophysical Institute to enlarge the facilities. Most of the optical equipment will be moved to a room adjacent to the present facilities. This will allow having one room for browse purposes and another for actively working with the data.

2. Phoenix

- a. Assistance, training, information, and use of the facility were provided for: development of detailed plans for multi-level aerial photography over the Black Mesa coal mining region of northern Arizona; use of the zoom transfer scope to transfer geologic information from high altitude aerial photographs to standard 7.5 minute topographic maps; use of skylab imagery for design and location of a new atomic power plant and associated power-transmission network in central Arizona.
- b. Schumann attended a meeting with Mr. Carl Guernsey, SCS State Soil Scientist, and his staff to review and discuss a new 1:1,000,000-scale Arizona State Soils Map that is being printed on the SCS LANDSAT Image Base of Arizona. The soils map is also being drafted on a 1:1,000,000 scale Lambert Conformal Project to allow it to be composited with the USGS Arizona LANDSAT Image Map.
- c. On August 13-15, 1975, Schumann visited Stanford Research Institute in Menlo Park, California, to use the Electronic Satellite Image Analysis Console (ESIAC) for analysis of changes in snowcover in central Arizona using 1975 LANDSAT imagery. This work was very successful, and a film showing the results will be prepared.

3. IACS

- a. Activity has concentrated on compiling both the FY 1975 EROS Progress Report and the Skylab Principal Investigators Report. Both reports were completed during the month. A new person was trained in the operations of the center so that a smooth transition will occur upon the present chief's departure. Copies of the Skylab photography over Latin America, previously maintained in the EROS Center were forwarded to the Latin American Centers. With the completion of the Skylab Experiment, it was felt that the extra copies would be more useful in the centers. A total of 12,281 frames were forwarded.
- b. One hundred sixty-nine frames of ERTS imagery were ordered during August primarily for the EROS Center in Ecuador which has begun a large reorganization and ERTS Project. There were twenty-two special requests researched, twelve browse customers, and twenty telephone inquiries. The special requests included two from the EROS Center in Costa Rica which is interested in using CCT's for forestry inventory.
- c. All the Principal Points over Latin America have been plotted and a system developed to update the information as new imagery is received from the standing order system. With this system, we will be able to see the degree to which we have fulfilled our commitment to provide one-time cloud free imagery to all Latin America.

4. Reston

- a. Persuaded the Delaware Geological Survey to sponsor the second International Symposium on the new basement tectonics meeting for summer 1976. The meeting will be held in Newark, Delaware, at the University of Delaware Convention Facility. Reviewed papers on "Tectonics of the Middle Atlantic States", a symposium arranged by the Reston AAF and given at the March meeting of the ASP. The plan is to publish these in the ASP bulletin. Arranged with Roland Wood, Chief, Cartographic Division of the World Bank, to give seminar and workshop on LANDSAT imagery. I was approached by Dr. William Carpenter in charge of extension services, Northern Virginia Community College, to give course on Remote Sensing. This will probably occur in the winter term. A one quarter course will be offered at the new University of the District of Columbia this fall.

5. NSTL

- a. During this reporting period approximately 125 students were trained during three workshops at NSTL and seven in Alpbach, Austria. The first two workshops were conducted for students from the University of Mississippi's Department of Urban and Regional Planning. Each of the students completing the courses were granted six hours of university credit. This was a cooperative

training effort with instructors provided by NASA's Earth Resources Laboratory, Mississippi's Office of Science and Technology, Gulf Regional Planning Commission and the Greater New Orleans Regional Planning Commission. Several land use mapping exercises were employed. Materials used in the class consisted of maps, reports, aircraft photos, LANDSAT imagery, enhanced LANDSAT computer-derived products from JPL and Goddard and Skylab multispectral photos. This was the first workshop in which we employed "role playing" group problems. Specific groups were assigned tasks dealing with urban and regional problems such as traffic analysis, future land use estimation as well as standard land use inventory practices. Field trips to Pascagoula for ground truthing were carried out. Students' work was critiqued by people working in the planning field who were familiar with remote sensing products. All in all these workshops were considered to be one of our finest to date, and the university has expressed a desire to establish a remote sensing course with out help and would like to repeat this effort again next year during the summer session.

The third NSTL workshop was given in cooperation with the Louisiana State University/Mississippi State University Logging Operations Center for 11 foresters from private industry. The use of high altitude color infrared photography was stressed as requested by the participants. Numerous in-house, hands-on exercises and field trips were conducted. Some of the critiques of the workshop indicated the need for more emphasis on forestry problems, such as the development of volume tables for aerial photo cruising--and the effects of remote sensing on forest management problems.

The seven workshops in Alpbach, Austria, were handled by Gary North who participated in the 1975 Alpbach Summer School sponsored by the Austrian Space Agency, the Norwegian Space Council and the German Space Institute. Over 90 students from eight countries attended these workshops and a two-hour evening lecture. The workshops were entitled, "Analog Photo Interpretation Methods" and included an introduction to photo interpretation, a practical exercise in interpreting LANDSAT imagery of the Alpbach area and hands-on experience with two color additive viewers and the VP-8 image analysis system. A two-hour general lecture was presented to the scientists, families and hotel guests during the second week of the school.

- b. Final preparation of a paper entitled, "Near Real-Time Mapping of the 1975 Mississippi River Flood in Louisiana Using LANDSAT Imagery", was completed. Authors for the paper are Eddie Schwertz, Jr., Bradley Spicer and Hank Svehlak. The report deals with the operational mapping of the 1975 Mississippi River flood in Louisiana. This paper will be presented at the 11th Annual American Water Resources Association Meeting to be held November 12-13 in Baton Rouge, Louisiana.

6. Menlo Park

- a. Arrangements for monitoring thermal activity on Mt. Baker were discussed by Jim Seitz with Mark Meier in Tacoma and David Frank in Seattle. Thermal activity has increased considerably on the volcano and studies are being made on a continuing basis. The proposal is to utilize a NASA-Ames aircraft with a calibrated thermal IR scanner aboard to monitor the mountain on a regular periodic basis. This will provide an indication of overall changes in the heat emission and provide a warning in case of greatly increased activity. This project is a compatible addition to the Pacific Northwest Demonstration Project as it is related to potential changes of the environment. Flights will commence in January when the scanner is installed. Lathram and Reynolds spent most of the month concentrating on analysis of NOAA, NIMBUS and LANDSAT imagery preparing a paper for the Pecora Symposium in October.
- b. Don Wiesnet of Environmental Satellite Services, NOAA, visited on August 21 and 22 to discuss NOAA-EROS interaction, the use being made by Lathram of NOAA imagery in geologic research, the value in use of the SRI Time-Lapse capability in snow monitoring particularly with our inclusion of GOES and NOAA with ERTS to provide continuity. Lathram, Seitz and Wiesnet visited the Redwood City facility of Environmental Science Services where local NOAA and GOES data are received. On August 25 Ron Lyon of Stanford University discussed with Lathram interaction between Stanford and EROS, not only with relation to remote sensing activity of students employed part-time at the AAF but also with relation to the utilization of Stanford computer analysis capability in the Service's mineral resource exploration programs.

II. Problems

None

III. Statistical Reports

The Data Production Statistical Summary for the month of August and year to date and a Data Base Summary are attached.

EROS Data Center and
EROS Applications Assistance Facilities
Monthly Activity Report
September 1, 1975 through September 30, 1975

I. Accomplishments

A. EROS Data Center

1. Hardware and software performance reviews have been completed for the Burroughs B6700 computer system. Formal acceptance testing began on September 24, and will continue for a minimum of 30 consecutive days. The acceptance benchmark test was successfully completed in a little over two hours. Completion of this benchmark test achieves the first major milestone in the formal acceptance test requirements.
2. Conversion of the IBM 360/30 software for operation on the B6700 continued. Testing of the data base and inquiry system are currently in progress. The Phase I data base for the new Business Information System has been compiled and loaded. The various storage and retrieval techniques will be tested to determine the optimum structure for the Phase I data base.
3. EDC terminal network requirements have been prepared and transmitted to the Department Office of Telecommunications for their approval and submittal to GSA. Burroughs and IBM terminals have been interfaced to B6700 system and tested successfully. The Univac 90/30 computer compatible tape copy and reformatting system has been shipped and will be installed the week of October 13.
4. The Fifth International Remote Sensing Workshop was completed during this reporting period. Attending were 31 students from 19 different countries. Twenty-seven students remained at EDC for the optional fourth week of training regarding advanced digital data analysis techniques and individual study requirements.
5. EDC personnel worked with representatives of the Atlanta Regional Commission (ARC) to perform urban land use change analysis of the Atlanta, Georgia area, using the GE Image 100 system and LANDSAT CCT's. Prior to the visit by the ARC, temporal overlays were created, using 1972 and 1974 data. A data set, resulting from ratioing the band 5's, was used for extracting a land use change theme which indicated areas of urban expansion. Additionally, a 1974 land use classification was performed over most of the ARC region. The total area of the analysis aggregate was approximately 1.3 million acres.
6. Negotiations with NASA/Ames Research Center personnel for the EDC LARSYS Conversion System continued. Hardware specifications have

been prepared, and contract award is anticipated during the second week of October. Software specifications will be completed during October and incorporated into the contract package.

7. An Advent display system has been installed in the Data Analysis Lab (DAL) to improve training and demonstration activities for large groups. The system consists of a seven-foot television screen and color video-beam projector. The Image 100 PDP 11/35 computer system disc and core memory has been increased to implement the RSX110 multi-tasking operating system. Software development in the DAL included effort on "equal areas" on contrast stretch, image processing, video exchange, implementation of CCRS Intel memory verification diagnostic program, resolution program, "maximum likelihood" and "fast video input/output."
8. Development of the High Resolution Film Recording System (HRFRS) continues on schedule with no significant problems. The HRFRS contract has been modified to expand certain operational features agreed to at the 8/75 critical design review. Programming for the HRFRS test tapes is complete and magnetic tapes in both 800 and 1600 bpi have been produced. Programs for the PDP 11/20 - optronics system to produce images for test tape verification remain to be completed.
9. A new system has been initiated to inform EDC customers as to their financial standing with the Data Center. A Work-In-Process sheet is included with a copy of the customer's ledger sheet instead of a formal letter. Approximately 300 fewer letters per month need to be prepared by User Services due to this new procedure, plus the customer gains an added understanding of his financial status from the information contained on the Work-In-Process sheet.
10. Data sales in the EDC Data Reference File (DRF) reached \$5,164 this month which more than doubles the sales of any prior month since the DRF opened. Assistance to drop in visitors continues to increase also.
11. Representatives from USGS Reston conducted two one-week evaluations at EDC. One group reviewed personnel management practices and the other conducted a Space Utilization Study. Preliminary results of these reviews were discussed with EDC personnel and final reports should be completed in a couple of weeks.
12. Preparations continue regarding EDC support for the Pecora Symposium to be held in Sioux Falls, October 28-31. Required audio visual equipment has been identified and will be available. Computer terminal equipment planned for use at the Symposium has been received at EDC.

B. EROS Applications Assistance Facilities

1. Alaska

- a. Assistance was provided to the Corps of Engineers in determining the extent of a suspected shoal in Cook Inlet. This shoal was effecting navigation in the area but more evidence was needed before the million dollar dredging project to remove the shoal could be authorized. Analysis of some NP-3 photographs, obtained during low tide in 1972, revealed part of the bar and provided the last bit of evidence needed to justify the dredging project. Another project for the Corps of Engineers entailed the preparation of a report concerning the structural lineaments, seismicity and geology of the Talkeetna Mountains area of Alaska in response to their request for data relating to potential geophysical hazards in the location of several civil engineering projects. Thirteen LANDSAT images of the 43,000 square mile region were interpreted in preparation of this report.
- b. Work on the flood plain mapping of the Delta continues. Flights to obtain ground truth were made, a bibliography of all previous flood information of the area was compiled and in early October a field study will be conducted by several hydrologists and geologists.

2. IAGS

- a. Assistance, training, and information were provided in response to a variety of inquiries. Graphics depicting coverage of Skylab and LANDSAT imagery have been developed and forwarded to National EROS Centers in Latin America.
- b. Three hundred ninety-six frames of ERTS imagery were ordered during this reporting period and five hundred eighty two frames of ERTS imagery and twenty eight frames of Skylab imagery were shipped.

3. Phoenix

- a. Met in Flagstaff, AZ with Gordon Swan and representatives of the Arizona Resources Information System Project, State Highway Department, State Land Department, and the Game and Fish Department to review on-going remote sensing projects with the state agency representatives in attendance. Interest in the use of computer enhanced LANDSAT imagery of the Flagstaff area was expressed by the Game and Fish Department and interest in advanced photogrammetric techniques was expressed by the State Highway Department.
- b. Accompanied Mr. Richard Raymond, Geologist for the U.S. Bureau of Reclamation, on a helicopter reconnaissance of the Picacho Reservoir area of Pinal County to study earth fissures that may affect the USBR Central Arizona Canal that is now under construction. Scores of fissures mapped by Schumann in 1969 were observed and two areas of new and recently opened fissures were found in central Pinal

County. Orthophotoquads produced under the ALUE project are being used by the USBR to help map the earth fissures in the Picacho Reservoir area.

4. Menlo Park

- a. During the meetings of several Task Groups at Ames September 8 to 10, a Pacific Northwest Task Force meeting was held to evaluate progress. The amount of progress to date and the number of agencies actively involved impressed all members of the Task Force. A significant feature was the voluntary participation of University personnel in the Pacific Northwest at University expense assisting State personnel in accomplishment of task activities. This is particularly true of the State of Washington. Another significant feature is the active cooperation and inter-play between agency personnel of the various States and the unified approach of the Task Force itself signifying achievement of one of our goals - a truly regional approach to the Pacific Northwest problems. In addition to PNW Task Force meetings, a workshop for planning a BLM/Ames/EROS Range Project was held on September 11 and a workshop for planning BLM/Ames/EROS Outer Continental Shelf environmental studies was conducted on September 15.
- b. The PNW Demonstration Project has been selected by HUD and the Bicentennial Committee as one of 200 "Horizons" projects demonstrating advances in community cooperation and development. For this Ames, EROS and the Commission will prepare panels exhibiting the aims and products of the Project for display at three State capitals which will then be advertised by the Bicentennial Committee.
- c. Discussions were held with the Conservation Division supervisor for the Western Region regarding ways in which Conservation Division in concert with EROS and Ames could approach the use of remote sensing in their management responsibilities on public lands. It was suggested they might take the lead role in strip mine monitoring, much as Water Resources Division has taken the lead role in the East. Conservation Division is interested in assigning several staff men to work with Ames and EROS, to learn remote sensing procedures and to coordinate and carry out operational remote sensing activities in the future. Additional planning workshops for this activity are envisioned as soon as they have identified their priority problems and available staff.

5. NSTL

- a. From September 8-11 a workshop on the basics of remote sensing was held at the NSTL/AAF. This workshop was scheduled for National Park Service personnel from the Denver Federal Center. In addition, three positions were filled by people from Thomas Watkins Cartographers, Inc. of Jackson, Mississippi. Emphasis was placed on land use mapping and resources inventory. The workshop included demonstrations of map and image digitization and a walk through NASA's computer facility where maps were being produced for the

National Park Service on a large flatbed xynerics plotter. The land use exercises dealt with coastal zone areas. The National Park Service has 24 additional trainees scheduled for January and February workshops.

- b. Assistance, training, and information were provided for many areas of interest including: use of aerial photography by Louisiana Department of Highway personnel to determine forest damage caused during the location of a highway; transfer of activities and information between the AAF and North Carolina Science and Technology Research Center; use of color IR aerial photography to type map the vegetation in the marsh areas of southern Louisiana; use of imagery by Corps of Engineers to study currents and sediment patterns in the Atchafalaya Bay; use of color IR high altitude aircraft photography by U.S. Fish and Wildlife Service personnel to determine illegal canal developments in the southern coastal areas of Louisiana; and use of equipment and imagery to measure acres of forest types in southern Alabama and Louisiana.

6. Reston

- a. Two courses on Remote Sensing and the use of LANDSAT were started during this reporting period. The first is to the Cartographic Unit of the World Bank. This will be a one 2-hour workshop per week for six weeks. The second is a semester course at the Washington Technical Institute to the Department of Geoscience.

II. Problems

None

III. Statistical Reports

The Data Production Statistical Summary for the month of September and year-to-date and a Data Base Summary are attached.

EROS Data Center and
EROS Applications Assistance Facilities
Monthly Activity Report
October 1, 1975 through October 31, 1975

I. Accomplishments

A. EROS Data Center

1. The technical evaluation committee completed evaluation of the building and grounds maintenance proposals and submitted their findings to the Contracting Officer. Negotiations for the guard service contract for the period December 1, 1975, to November 30, 1976, have been completed and award made to Wally Trigg, Dell Rapids, SD.
2. Activities regarding the High Resolution Film Recording System (HRFRS) continue on schedule. A detailed HRFRS site inspection and development progress meeting was held at EDC with Goodyear Aerospace Corporation representatives. The contractually required HRFRS Test Tape was completed and delivered to the HRFRS contractor as scheduled. Software development has been initiated for the HRFRS RLT punched tape program to be implemented on the PDP 11/35. The HRFRS geometric accuracy reference grating was received from Bausch and Lomb and checked out. An overlay program to read ESET test tape and output to Optronics P1700 has been written and compiled. Linking and debug running has been held up by disk trouble in the PDP 11/20 which is now in the hands of the DEC representative. This overlay program is written to handle all band sequential tapes, with minor program modifications. System delivery to EDC is scheduled for February 20, 1976.
3. Effort continued on the development of the Mark II system for operation on the B6700 system. A series of Mark II operation training and indoctrination sessions were held with the Computer Services and Data Production Branches. Substantial revision to the Standing Request and Order System is underway, and a release of this module will be made in early November. The User Services Procedure Manual specified as the final deliverable from the MATSCO contract which ended October 8, was completed and has been accepted. Major design emphasis is currently on the Mark II data base structure, and related Phase II software design.
4. Acceptance testing was completed October 23rd for major components of the B6700 computer system. The basic system performed at a 99% effectiveness level; with one disk drive and six terminal controllers failing the test. Testing of these components will continue until they have successfully completed the acceptance period. The monthly lease of the B6700, exclusive of components not yet accepted, will begin retroactive to September 23rd.

5. IBM 360/30 software conversion continued. The next phase of the effort involves the Order Processing System with about 35 programs to be converted. These programs were to be transferred during October but have not been received from Burroughs. Receipt and installation at EDC should occur during November. The last major phase of the conversion includes all management reports scheduled for completion prior to January 1, 1976. The Univac 90/30 system has been installed with customer engineers testing the system through the first week in November.
6. EDC will purchase a copy of the DISSPLA Graphics software package to minimize software development required to implement applications for the CalComp Flatbed Plotter. A contract should be awarded in November resulting in installation in January. Detailed evaluations of all proposals received in the Departmental Procurement of Terminals were evaluated during the last week of October at EDC.
7. A one week workshop was conducted for personnel from the Oregon State Department of Forestry. Objectives of this training course were to provide the participants training and experience with advanced digital data classification techniques to be used in the PNW project and to evaluate other potential applications to state land and service forestry resource evaluation. The Image 100 and LARSYS multispectral image processing systems were used to process images over ongoing project areas within the State of Oregon.
8. A Remote Sensing Workshop was conducted in Magadiscio, Somalia for the Somalia Ministry of Livestock, Forestry and Range, and the FAO/UNDP Remote Sensing Seminars were conducted in Addis Ababa, Ethiopia for the FAO/UNDP and the U.S. Agency for International Development. A report has been prepared for the F.A.O. regarding activities and recommendations for future remote sensing programs in Somalia.
9. Approximately forty hours of video-cassette tapes were recorded during the Fifth International Remote Sensing Workshop that was conducted in September. This video data is being edited and packaged in preparation for various future uses such as:
(1) "stand-alone" video-cassette training modules, (2) slide-cassette "capsule" versions, and (3) "highlights" versions for video-review and communication purposes. Aids of this nature will greatly assist future Data Center training activities.
10. Major activities in the Data Analysis Laboratory centered around preparing for the demonstration planned for the Pecora Symposium tours. Installation of the Advent Videobeam 1000A projection system was completed with addition of a switching capability between the ISI-170 and Image 100 hardware. Software developments included a contrast stretch algorithm based on equal occupancy and installation of the Canadian program for maximum likelihood resolution of overlapped theme areas in the Image 100. Preliminary system functions were specified for the ISI-170 operating monitor. The Image 100 system was operated 344 hours during this reporting period of which 82% utilization was for internal and external analysis activities.

11. EDC supported the Pecora Symposium held in Sioux Falls October 28-31. Support of the symposium consisted primarily of: conducting eight-one hour scheduled tours of the Center on Tuesday and Friday afternoons; (of the approximately 600 attendees to the symposium more than 400 participated in these tours of the Data Center); all audio visual equipment and operators required were provided by EDC; setting up and manning a USGS/EDC Exhibit and display area at the Holiday Inn consisting of information panels from Reston and EDC, microfilm and a microfilm viewer, WRS photos, photos of the 100 major cities, various brochures and information packets, and a computer terminal for accessing the EDC data base. Approximately \$5,000 worth of orders were generated by symposium attendees.

B. EROS Applications Assistance Facilities

1. Alaska

- a. Soil Conservation Service hydrologists and geologists returned to Alaska to field check preliminary flood hazard boundaries mapped from stereo U-2 photography. The team, with a Geophysical Institute staff member, spent a week in Big Delta verifying results and making minor refinements. A LANDSAT image enlarged to one inch-to-the-mile showing actual flooding from an aufeis dam was used by the team to identify a type of flooding that otherwise would have escaped attention. The final map prepared by SCS will be used to evaluate results from digital classified satellite data to test the feasibility of flood hazard mapping directly from LANDSAT data.
- b. A representative of the National Park Service visited the facility in early October to select LANDSAT imagery of areas that are proposed national parks in Alaska. A large order for summer color imagery was prepared for him which will be used as a data base for analysis of the proposed park areas. He will return in early November to select winter imagery for the same areas. Discussions continued with the Bureau of Land Management regarding two projects they want accomplished. The first would involve a vegetation mapping of the 40-mile area of Alaska which has not been previously mapped. The area involved covers eighteen inch-to-the-mile quadrangle maps. The second project would entail a joint BLM-University project to produce a "land use" map of the western portion of the Kenai Borough. Two draft proposals are in preparation at the request of BLM to cover these projects.

2. IAGS

- a. Graphics depicting minimum cloud coverage of LANDSAT imagery available over Latin America were updated. This is a continuing process as all new incoming imagery is checked against the graphic in order that new images with less cloud coverage than shown may

be identified and plotted. These 1:5,000,000 scale graphics colorfully show at a glance if 0 to 30 percent cloud-coverage imagery is available to a potential user. In progress, is the reduction of these graphics to a size that can be included in our reports.

- b. Eight hundred twelve frames of ERTS images were processed and shipped to the appropriate Latin centers and twelve color composites were shipped as a result of previous special orders. Six Spanish language articles were copied and distributed to each of our 17 national centers. Also, seven copies each of 239 articles in microfiche form were made and distributed to six national centers and Mississippi Test Facility.

3. Phoenix

- a. Mr. Rui Henriques of Lisbon, Portugal, visited the facility to receive a week's training in the application of remote-sensing techniques to operational water resources problems. In addition to applications of satellite and aerial imagery, Mr. Henriquis was briefed in detail on hydrologic applications of satellite telemetry (LANDSAT and SMS/GOES) including a visit to a DCP-equipped snow-monitoring site in central Arizona. Late in October Schumann and Sanger attended the ASP/ASCM Fall Technical Meeting, and helped monitor both the USGS and the Arizona Land Use Experiment exhibits. Schumann also chaired two technical sessions during the meeting. Attendance at the meeting exceeded 1,460 people.
- b. Messrs. Herb Large and Ig Gruenwold of the Bureau of Reclamation visited the Phoenix AAF to discuss remote-sensing activities and to review the capabilities of image analysis equipment being considered for purchase by the Bureau. Mr. Coyd Yost of Dames and Moore requested and received assistance in selecting and obtaining NASA high-altitude coverage of a large area in northern Arizona for use in a study involving routing of transmission lines. Mr. Bill Smith of the Bureau of Indian Affairs in Window Rock requested assistance in ordering NASA high-altitude black and white and color coverage of part of the Navajo Indian Reservation in northeastern Arizona.

4. Reston

- a. During the month additional space and additional storage facilities were made available to the AAF which has relieved congestion to a large extent. Finished a 12-hour series of lectures to the cartographic section of the World Bank. Continued with a lecture series on remote sensing at Washington Technical Institute for the U.S. Geological Survey's Minority Education in Earth Science group. Assisted Jan Katina in finding support at Washington Technical Institute for his laboratory of Geotectonics and Metalogeny. Chaired a meeting for the regulation and legislative committee of the AIPG for a discussion of land use with Congressman Steelman (R-Tex).

5. NSTL

- a. Data sales at NSTL reached an all time high of \$10,000 during this reporting period which is twice that of any prior period. Assistance was provided to visitors including: providing color infrared photography for timber type mapping in Mississippi and Louisiana; representatives from the Louisiana Department of Corrections analyzed photo coverage over the Angola Penitentiary during periods of Mississippi River floods to determine where new buildings should be located; use of zoom transfer scope and imagery by representatives of the New Orleans Parkway Commission to prepare forest maps and update police department maps; use of low altitude aircraft imagery by representatives of South Central Bell to plan location of power line structures; use of aircraft imagery for large land developments; and prepared a mosaic of the Oregon coast using color IR photography for the Bureau of Sport Fisheries and Wildlife which will be used to map underwater vegetation.
- b. A forestry remote sensing workshop was held for twelve representatives (ranging from technicians to district supervisors) from International Paper Company. A representative from Peabody Coal Company also audited the course. The main emphasis of the workshop centered on forest type mapping and aerial cruising. The workshop stressed the use of color infrared photography in field operations (boundary locations, aerial reconnaissance, etc.).
- c. Ten people from the Kennedy Space Center attended a remote sensing workshop held October 21-24. The group consisted of people from flight operations, library and several of their researchers. In addition, Professor G. Edwards from the University of Florida and Ernst Zwart of Lockheed Electronics Company at NSTL were attendees. Professor Edwards is currently doing multispectral sensing of citrus young tree decline and has also been working with the KSC group on thermal imaging of diseased citrus groves. The course was very successful because the people at KSC have expressed a desire to send additional people to another workshop in January.

6. Menlo Park

- a. A PNW Task Force meeting was held in Vancouver, Washington to discuss accomplishments and future plans. Stratton reported on status of work and the amount of activity and number of user personnel involved. The decision of the State of Washington Department of Natural Resources to contract for an enlargement of the Phase III Demonstration area as part of their timber inventory program in advance of completion of the Demonstration is encouraging. User participants are also beginning to consider the steps that need to be taken in the transition from the Demonstration Project to actual operations in the State Agencies.
- b. The last week of the month Lathram presented a paper co-authored by Bob Raynolds on lineament study and tectonic analysis from satellite imagery, and co-authored a paper presented by Andre

Maurin, Compagnie Francaise des Petroles, on the geometric analysis of structural elements, at the Pecora Symposium. At the request of the California Aerospace Education Association, Seitz gave a talk on applications of satellite imagery to the Fall Conference of this organization combined with the Pacific Region Aerospace Education Directors Workshop. This was held at South Tahoe, California, and was attended by over 200 representatives from the six Western States plus Alaska and Hawaii. As most of the delegates were teachers the information included in the talk will eventually reach a wide audience of students. Contact with this organization will provide opportunities for disseminating information to increasing numbers of interested students.

- c. An attorney in the office of the Los Angeles County District Attorney's Office requested information on satellite images covering the Island of Hawaii. The images will be used in a \$500,000 land swindle case as evidence of the fraudulent claim of the defendant regarding terrain in the area where lots were sold. Results of this use will be checked when the case has been decided. In compiling a list of operational uses of LANDSAT, Al Kover inquired about the Alaskan Branch's PANRAP and AMRAP programs. So far 3 quads have been produced as mosaics from stretched, ratioed, and otherwise massaged LANDSAT images. Nine more will be included in this series, and 18 more quads will be produced for a program in the Brooks Range. Eventually all 149 quads in Alaska will be produced as LANDSAT mosaics as part of the Alaskan Branch's resource study.-

II. Problems

None

III. Statistical Reports

The Data Production Statistical Summary for the month of October and year-to-date and a Data Base Summary are attached.

EROS Data Center and
EROS Applications Assistance Facilities
Monthly Activity Report
November 1, 1975 through November 30, 1975

I. Accomplishments

A. EROS Data Center

1. Close monitoring of the High Resolution Film Recording System (HRFRS) contract continued. The contract is on schedule with the next progress meeting scheduled at Goodyear 12/3-5/75. A second version of the HRFRS test tape has been generated, verified on the Optronics system and delivered to the contractor for his systems test. A program has been designed to produce punch tapes to load the look-up tables of the HRFRS. The input will be: 1) measured densities and corresponding output digital numbers for test images, and 2) output digital numbers and corresponding photo densities. The output will be a punch tape containing 256 nine bit numbers to be stored in the HRFRS look-up table.
2. Phase I of the Digital Image Enhancement Project has been completed. A report regarding the details, objectives and results of the project will be available in December upon completion of photographs required for the report. Reprogramming and improvement of the software used on the PDP 11/20 and 11/75 computer systems for use on the Univac 90/30 system has started in support of the plans detailed in Phase II of the project.
3. Technical evaluation of the proposals submitted for the Departmental Terminal procurement activity has been completed. The technical evaluation report is in the concurrence cycle and should reach Branch of Contracts during the week of December 8. Branch of Contracts will subsequently complete negotiations and request firm and final prices.
4. Verification of the software systems that have been transferred from the IBM 360/30 system for operation on the B6700 system continued. A correct data base has been created and daily additions of new accessions are being processed. The Data Inquiry system has been partially verified. Verification of the Order Processing System constitutes the bulk of the effort remaining. The scheduled completion date for verification of all transferred software system is January 5, 1976. Acceptance tests began November 10, 1975, for the Univac 90/30 tape copy system and are scheduled for completion December 9, 1975.
5. A four-day training course/workshop was conducted for 30 Bureau of Reclamation personnel. Objectives of the workshop were to provide the participants training and experience regarding applications in agriculture, hydrology and geology as they relate to Bureau of Reclamation requirements. In addition, EDC personnel conducted two photo interpretation workshops (one in Denver, Colorado and one in Albuquerque, New Mexico) for the Bureau of Land Management and

presented the digital image processing and analysis portion of the Forestry Remote Sensing Workshop held at NSTL, Bay St. Louis, November 10-14, 1975.

6. A meeting was held with NASA, U.S. Forest Service, and EROS representatives to discuss plans for a cooperative demonstration project in forestry. The purpose of the project is to demonstrate remote sensing capabilities to acquire forest and range resource data to enable the U.S. Forest Service to efficiently collect information in response to the Resource Planning Act of 1974.
7. A meeting was held with representatives from the National Cartographic Information Center (NCIC) and the Western Mapping Center (WMC). Long-term system procedures and design objectives were established for 1) a system for the mapping centers to process and control all mapping product orders within their photo labs via terminal to the EDC computer (and its data base), and 2) a system for NCIC to provide total centralized customer inquiry, accounting and billing for their products from all locations, again via terminal to EDC.
8. Development of the new data production software system that will operate on the B6700 system continued. Completion of program coding and compilation of approximately 100 program modules is scheduled for February 1, 1976. This will allow five months for program integration, implementation, testing, user training and documentation to be completed by the scheduled system operational date of July 1, 1976.
9. Effort regarding the South Dakota Land Use Cooperative Demonstration Project continued. Drafts of an Application Example and a Documented Application Package have been completed and are currently in review. A South Dakota Land Use Patterns Map has been produced by state personnel as part of the project Phase I activities. As a spin-off of the project, the State Planning Board is working with the second district Planning Development District on a computerized, interactive land use model for Minnehaha County. The model currently incorporates the results of digital (LARSYS type) classification of Landsat data with soils survey data.
10. Effort continued on the Atlanta Regional Commission (ARC) project, the principal activity being verification of analysis completed in September. Evaluation of a 136 square kilometer area, i.e., comparison of Landsat results with aerial photography, showed that urban land use changes can be mapped accurately 91.4 per cent of the time, plus or minus 2.7 acres.... Results of the ARC project were presented to the Image 100 Users Group (IUG) meeting at the Jet Propulsion Laboratory, Pasadena, California, 19 & 20 November, 1975.

B. EROS Applications Assistance Facilities

1. IAGS

- a. The graphics of Landsat best coverage, depicting 0 per cent to 30 per cent cloud coverage have been sent out to the National Centers in Latin America. The master graphics are updated with each shipment of Landsat imagery received from the EROS Data Center.

2. Alaska

- a. The North Slope Borough has submitted a purchase order for a Landsat mosaic of their borough at 1:250,000 scale, an area covering approximately 88,300 square miles and comprised of twenty-two Landsat images. Personnel at EDC have been experimenting with printing Landsat enlargements to exact scale using clear mylar map overlays to check the scale. Samples have been sent to us and are in review.
- b. This month marks the end of the first year of operation as an Application Assistance Facility with year-end totals of: 612 users outside of Geophysical Institute personnel and total sales of \$30,278. Orders were placed this month for ten color, eight black and white, eleven queries and three CCT orders with a total dollar value of \$9224. One of the more interesting requests was for U-2 coverage of an area to be visited by President Ford on his recent visit to Alaska enroute to China.

3. Phoenix

- a. Conducted an aerial photographic reconnaissance of and ground visit to the WRD Black Mesa Environmental Monitoring Project, together with representatives from WRD. One Landsat DCP is now operating at this site and three convertible Landsat/GOES DCP's have been programmed for installation in the near future. Conducted an aerial photographic reconnaissance of earth fissures in Maricopa and Pinal Counties, together with a representative of the Geologic Division and Richard Raymond of USBR.
- b. A representative of EPA and TRW visited the Phoenix AAF to discuss availability of remote-sensing data over Arizona and the EPA efforts in air pollution monitoring in the Phoenix area. Met with Salt River Project personnel to discuss satellite snowcover mapping and DCS operations during the winter of 1975-76.

4. Menlo Park

- a. A briefing for Governor Straub of Oregon and the three Governors' Alternates on the Pacific Northwest Regional Commission was given on November 20th at Ames Laboratory to summarize the status of the various activities in the Land Resources Inventory (LRI)

Demonstration Project. During the briefing Governor Straub asked a number of questions, especially regarding matters of practical applications, and appeared to have a strong interest in the subject. The status of the individual projects was outlined for each of the states by the three Task Force representatives.

- b. The clear weather of November provided an opportunity to experiment further with the method of exposing diazo foils by sunlight. Initially this method was developed as a means by which a person could make up composites without needing the standard diazo processing equipment. The method proved practical as the composites produced by it were equal in quality to the ones from machine-processed foils, and actually were produced in less time. One limitation of the standard diazo equipment is the lack of flexibility - the operator cannot alter the contrast of a foil independent of its density. Therefore efforts were directed to developing control over the contrast and the density independent of each other. These efforts succeeded and as a result this method now provides far greater capability for controlling emphasis of the features desired. Slides that illustrate the method have been made and will be compiled as a slide-cassette presentation to use in workshops and demonstrations.

II. Problems

None

III. Statistical Reports

The Data Production Statistical Summary for the month of November and year-to-date and a Data Base Summary are attached.

EROS Data Center and
EROS Applications Assistance Facilities
Monthly Activity Report
December 1, 1975 through December 31, 1975

I. Accomplishments

A. EROS Data Center

1. The Univac 90/30 tape copy system has successfully completed all acceptance tests requirements. The system is being used for production of EDC edited master computer compatible tapes (CCTs) as well as customer CCT products.
2. The conversion of IBM 360/30 software for operation on the Burroughs B6700 continued. Operational support of data entry, data inquiry, and order processing on the B6700 is scheduled to begin January 5, 1976. Parallel processing of both the B6700 and the 360/30 occurred the last two weeks of December to minimize any problems that may occur. Parallel operation of the B6700 and 360/30 system will be continued as long as necessary after January 5, to assure confidence in the B6700 hardware and software system. A revised Data Inquiry System Users Guide has been prepared and distributed to assist users of the B6700 system. 360/30 software remaining to be converted includes the management reporting system and a series of 19 programs that provide weekly and monthly production statistics. These are scheduled to be completed by the end of January.
3. Applications assistance and training activities continued including: 1) orientation for members of North Dakota state and federal agencies regarding EDC activities, current uses of remote sensing data, and potential for remote sensing data applications to their respective agencies; 2) briefing to forestry and watershed scientists with the Tennessee Valley Authority (TVA) and presentation to the Kentucky/Tennessee chapter meeting of the Society of American Foresters, describing the types of remote sensing data and training and assistance available from EDC; 3) met with representatives of the Bureau of Indian Affairs (BIA) regarding a cooperative program to provide training and assistance in the use of small-scale aircraft photography for updating forest resource maps of the Navajo Indian Reservation; 4) conducted an advanced Landsat analysis workshop for the PNRG Idaho Range/Wildlife Group, prepared a preliminary plan for PNRG Phase III activities which will involve operational analysis of Landsat and U-2 photography for developing wildlife habitat type maps; 5) met with Al Marmelstein to outline plans for remote sensing training courses for the U.S. Fish and Wildlife Service; 6) conducted remote sensing workshop for the Northwest Mining Association and Columbia chapter of AIME, forty-seven industry and ten government geologists attended the workshop

which focused on targeting of mineral exploration effort in the Pacific Northwest, the workshop utilized practical exercises emphasizing the use of Landsat, Skylab, and aircraft data over the Silver City area of southeastern Idaho, materials developed in the course are being combined into an applications example for subsequent use.

4. "Highlights of the 1st William T. Pecora Symposium", a 35-minute video-cassette has been completed and copied for distribution to the EROS Program and American Mining Congress. In addition, audio and video cassettes are being prepared for each of the Pecora Symposium papers and presentations. Script-writing is in progress for slide cassette training modules covering applications of remote sensing to agriculture, geology, forestry, range management, and hydrology.
5. The Goodyear High Resolution Film Recording System (HRFRS) Acceptance Test Procedure (ATP) has been submitted to EDC for detailed review. The ATP is being reformatted and revised to provide increased cross-checks and more detailed procedures particularly in the geometric fidelity tests. A potential problem exists with the SO-141 film proposed for use with the HRFRS; further controlled tests will be conducted at Goodyear and EDC to acquire additional data. The programming has been completed to allow the PDP 11/20 Optronics system to process a Landsat image that is 3240 pixels by 3240 lines in frame sequential format. All debugging is not complete; however, enough has been completed to assure that the HRFRS data format can be processed.
6. Effort continued on the EDC Digital Image Processing System (EDIPS). Conceptual design of the system continued to be refined, and an EDC work flow plan has been generated. An evaluation of digital image processing techniques versus cost and computer processing time has been completed. All of these activities will be presented and discussed at the meeting to be held at EDC with representatives from the EROS Program Engineering Office and Operations Research Inc.
7. Negotiations were conducted for a one-year extension to the Technicolor Operations contract and a new contract for buildings and grounds maintenance. A post-award conference was held with the new guard service contractor, Triguard of Dell Rapids, SD. Because of weather conditions and the holiday season, the contractor will not complete the new Facility Support Building in time to permit final inspection by 1/15/76. Since there are no major problems, final inspection should occur before January 31, 1976.
8. The Data Center has started receiving Canadian quicklook microfiche of Landsat 2 data. A package has been designed for use in the Data Reference File to enable users to review and select data from the Canadian system. This package includes maps and the necessary instructions for use and will be implemented in January.

B. EROS Applications Assistance Facilities

1. Alaska

- a. Effort continued regarding the joint National Park Service/ Geophysical Institute mapping and training project. This project has been slipped a couple of weeks to mid-February to allow the participating training personnel time to study the images they will be working with. The objective of the mapping project is to train a team of National Park Service personnel in the preparation of "land use" maps from Landsat data and then for them to prepare similar maps of their areas of interest in Alaska.
- b. Plans have been finalized for the construction of the mosaic to cover the North Slope Borough. The order has been placed with EDC to make custom prints of the twenty-two Landsat scenes, matching density variations and enlarging them to a map base so that the finished product will be both eye pleasing and as accurate as possible.

2. NSTL

- a. The close of CY 1975 represents the third year of operation for the NSTL AAF. Visitors totalled 1469 this year, an increase of 22.2% over last year. The same kind of increase is expected this year. The Naval Oceanographic Research and Development Agency is in the process of moving 1200 people to NSTL, including several remote sensing groups. Several of these people have been transferred and are using the browse file and have attended workshops. 2727 terminal searches, an increase of 108.9%, were made with EDC. Orders increased by 54.7%, the number of units ordered increased by 38.9% and the dollar value rose by 81.7% for total data sales of \$58,630 during CY 75. In addition, twenty five training classes were conducted for 259 students.
- b. Assistance and training activities included: use of infrared aircraft photography to make a forest type map for wildlife studies of a portion of the Savannah River; use of Zoom transfer scope and high altitude photography to update land use maps of the Calcesieu Lake area in Louisiana; potential application of satellite data to sedimentation studies at the mouth of the Mississippi, Sabine, Atchafalaya and other Gulf Coast rivers; use of high altitude photography to determine development activities along the Louisiana coast; application of low altitude photography of the Atchafalaya Bay area for bird rookery studies, rookery locations and bird counts; and a variety of orientation and aircraft data and the equipments required for analysis activities.

3. IAGS

- a. The Skylab Earth Resources Data Catalogs have been received and forwarded to the seventeen Latin Centers. Agreement was reached between the Government of Honduras and the United Nations Development Agency to provide for an integrated development of

the Mosquitia Region. A geographic search of available imagery over the Mosquitia Region has been requested. Two hundred sixty-six frames of Landsat imagery were ordered during December and five hundred and nineteen frames were processed and forwarded to the National Centers. Eighty-one pages of Sea Surface Temperature charts were reproduced and forwarded to the Chile, Ecuador, and Peru National Centers.

4. Phoenix

- a. Attended the Federal Committee on Mining and Reclamation meeting in Las Vegas. The theme of the meeting was Remote Sensing Applications as related to mining, reclamation, and other energy related activities. Presented two briefings -- one on USGS remote sensing activities and a second on EROS Program activities. Also, while in Las Vegas visited the EPA Remote Sensing Facility. This operation consists of a reconnaissance aircraft group and associated supporting film labs and image interpretation equipment and has the primary responsibility for monitoring Continental oil spills throughout the U.S. and furnishes support for other EPA environmental monitoring and enforcement activities. At the request of NCIC met with the Chief of the facility to discuss the EPA remote sensing data base and how it might relate to the NCIC Program.

II. Problems

None

III. Statistical Reports

The Data Production Statistical Summary for the month of December and year-to-date and a Data Base Summary are attached.

